THE IRON AGE

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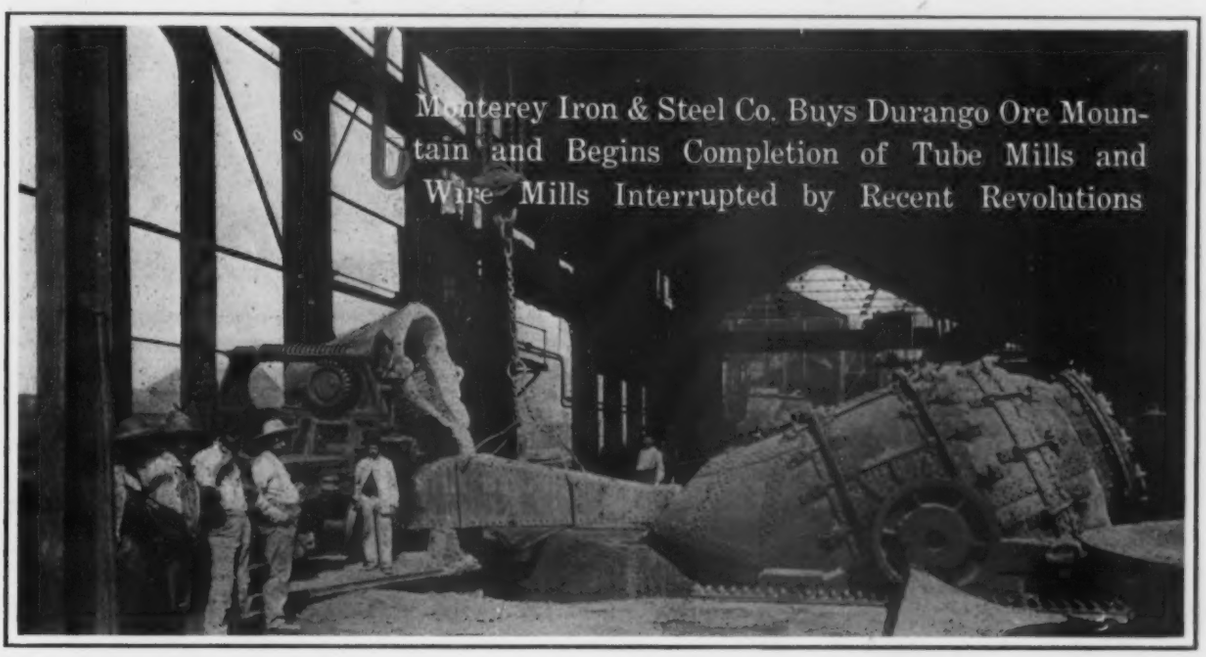
Mexican Plant Undergoes Rehabilitation



Monterey Iron & Steel Co. Buys Durango Ore Mountain and Begins Completion of Tube Mills and Wire Mills Interrupted by Recent Revolutions

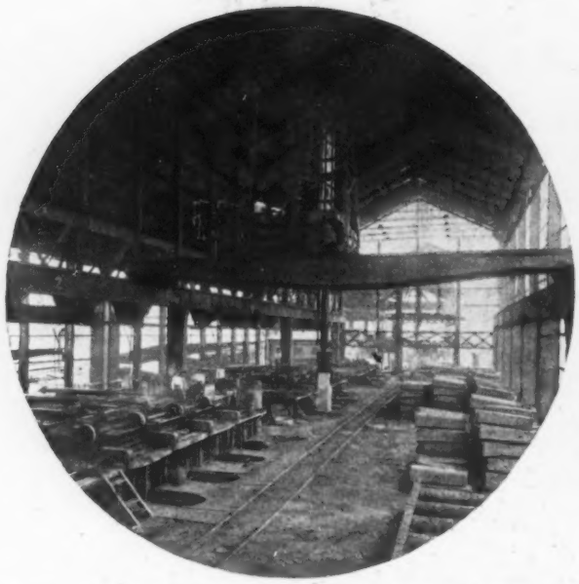
MORE stable conditions in Mexico have encouraged the Monterey Iron & Steel Co., at Monterey, Mexico, to make long contemplated extensions of its business, including the purchase of the well-known Durango mountain of iron ore, commonly spoken of as "Iron Mountain." This is situated near the city of Durango and consists of a mass of solid ore about one and a third miles long by one third of a mile wide and 200 to 400 ft. high. Reports of experts who have examined the deposit indicate that a conservative estimate of the quantity of ore in sight, above the level of the plain, is 360,000,000 tons, analyzing about 60 per cent iron.

The ore in this mountain is specular hematite, martite, or magnetite, according to locality. It is generally hard or massive, although at one end, where the only mining has been done, it comes out as a fine powder, or the lumps disintegrate into powder upon exposure. This powdery ore is suitable as "fix" in puddling furnaces because of its low silica content. At various times American, Japanese and German interests have negotiated for the purchase of this ore deposit. The purchase by the Monterey Iron & Steel Co. was completed a few weeks ago by its American representative, W. J. Moler, 5 Beekman Street, New York.

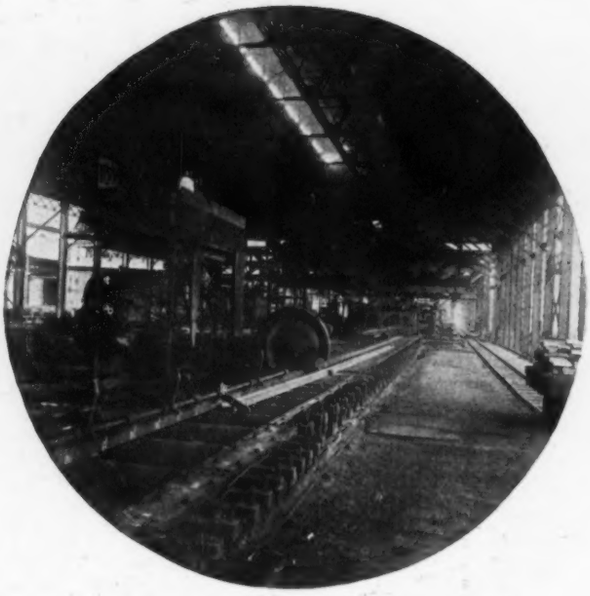
Among the improvements which have recently been provided for at the Monterey plant are tube mills having an annual capacity of 6000 tons with one 8-hr. shift per day; a wire department, capacity 6000 tons annually with one 8-hr. shift per day and a 3-ton electric furnace for making steel castings. The tube mills will make buttweld pipe ranging in sizes from 1¾ to 6 in., inclusive, and the wire department will turn out telephone and telegraph wire, galvanized wire, plain wire and wire nails.

Though the company was organized in 1900, it

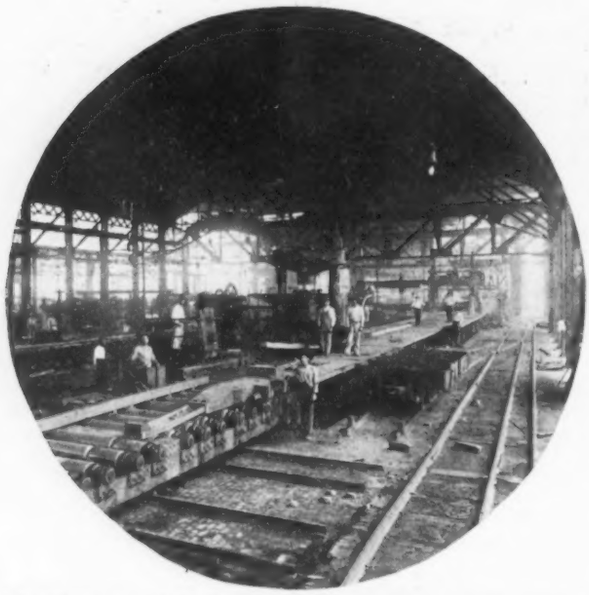
The Beehive Coke Ovens May Be Seen at the Right in the Panorama, with the Blast Furnaces Immediately Back of Them. The various mill buildings, foundry, machine shop and erecting shop occupy the rest of the landscape



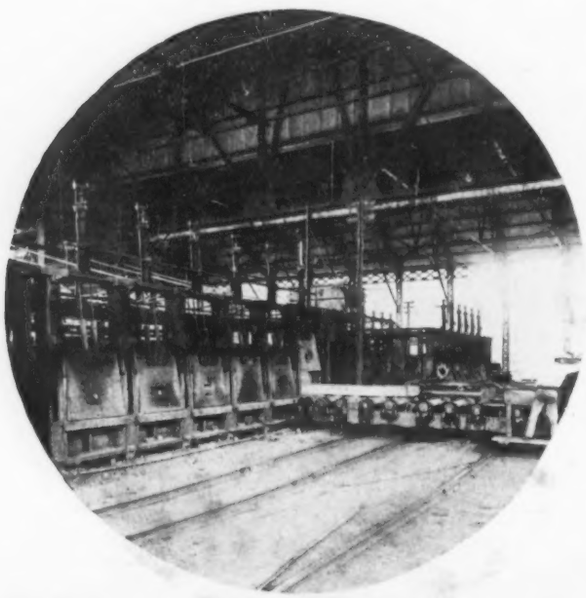
One Unusual Feature Is the Hoisting Mechanism of the Crane Serving the Pit Furnaces



Hot Saw on the Runout from the Rolling Mill



The Character of the Roll Trains Is Indicated in This View of the Transfer Table at the Hydraulic Shear



The Mill Equipment Includes These Bloom Reheating Furnaces with Roller Charging Machine

has never fully reached its productive capacity of 150,000 tons of steel annually because of the vicissitudes of the political life of Mexico. In 1903 it produced 8823 tons of steel; in the following year this was increased to 29,552 tons and for several years thereafter about the same rate of production was maintained. In 1909 and 1910 the production was approximately 60,000 tons per year, and in 1911 this jumped to more than 80,000 tons. There was no production in 1914 and in 1915 only 656 tons was produced.

The early development of the business was hampered by various factors, including lack of experience on the part of its organizers, insufficiency of capital, deficient development of the country's coal and iron ore mines, together with the disturbances through which the country has passed, due to recurring revolutions.

During all of this time the stockholders have been without profits, but they have not lost faith that the plant might ultimately come into its own, and the latest extensions are a part of a new policy to rehabilitate the business. As there is a high tariff on imported iron and steel, the plant will have sufficient protection to sell its products in the Mexican market providing there are no further political disturbances to disrupt business.

The Mexican railroads, telephone and telegraph lines and other public utilities, which have suffered damage or which have made little or no progress during the revolutions, are all greatly in need of reconstruction work which requires steel, and from these sources a profitable trade is expected ultimately to come.

The plant includes a modern blast furnace, with a daily capacity of 300 tons, with a battery of boilers fed by gases from the furnace furnishing power for the entire plant, including three large vertical compressors. Adjoining the blast furnace are ore bins with large capacity. Over these bins are steel trusses on which run the ore cars by gravity.

There are also 120 coke ovens of the beehive type, but these have been shut down since 1906, owing to lack of adequate washing facilities. In keeping with the rehabilitation of other departments it is expected that these ovens will be made suitable for use again.

Slag from the blast furnace is granulated as it

The 32-in. and 28-in. Rolling Mills

Cooling Beds for Structural Steel, with Fabricating Shop Beyond

comes out and is turned over to a cement factory, to which it has been sold for a number of years at $3 a ton (Mexican currency).

Adjoining the blast furnace is a cupola for melting scrap iron, with an hourly capacity of 10 tons. Mexico has an inadequate scrap supply, most of the old metals coming from the railroads, which scrap about 20,000 tons annually.

Connected with the furnace, by several railroad tracks and at a distance of about 500 ft. (150 meters) is the steel plant, at whose entrance is installed a Bessemer converter with a capacity of 15 tons per cast and capable of taking the whole production of the blast furnace. Steam locomotives transport in ladle cars the hot metal from the blast furnace to the Bessemer converter. This is served by a 50-ton travelling electric crane.

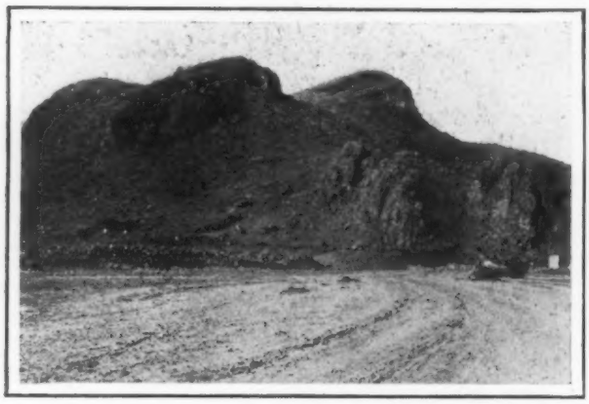
The duplex process is employed so that the Bessemer converter is utilized only to shorten the work of the open-hearth furnaces installed in the same department. The open-hearth installation was made in 1903. It comprises three furnaces of 30 tons per melt. They worked rather deficiently until 1910, when the new directorship of the company decided to tear them down and to build on their site four other furnaces of 35 tons, according to plans furnished by a German firm, with all the improvements in use at that time.

In 1913 it was resolved to substitute oil as fuel for gas. The substitution of the furnaces and the employment of petroleum lead the board of directors to believe in complete success for the operations when the country's peace allows them to carry out a long, uninterrupted operation.

The steel ingots obtained from the steel mill are carried by electric cranes, with a capacity for handling 700 tons per day, to the fixed reheating or pit furnaces. A 40-in. roughing mill does the first reducing. The capacity of the mill for 85-lb. rails is 700 tons of ingots in 24 hr., as it was calculated for transforming the production of two blast furnaces equal to the one now existing. The ingots, after being reheated in pit furnaces, go to the three runways of the other mills; one of 32 in. and 28 in., another of 18 in. and another of 12 in. Each of them is provided with the necessary modern elements for rolling, cutting, cooling, straightening and testing and turn out sections of beams, bars and rails as used in the Mexican market. The 40, 32 and 28-in. mills are operated

A Variety of Iron Foundry Work Is Done

One End of the Machine Shop



The Iron Mountain of Durango Acquired by the Monterey Iron & Steel Co.

by steam reversible engines and their accessories by electric motors.

Close to the rolling mill shop is the structural shop, with a monthly fabricating capacity of 600 tons. It has a 5-ton electric crane.

There exists at the plant a large foundry with an electric 30-ton crane, two 15-ton cupolas and another of 30 tons.

There is a machine shop for machinery construction and repair. In connection with this department is found the nail, screw and rivet factory, recently fitted out for a yearly production of 4000 tons.

There are a large forge shop, a tool shop, a building for the technical offices, a laboratory and storage, all independent, substantial brick buildings. There are besides, separate from the plant, a large hotel for employees, a sub-division of 300 houses for workmen, as well as others for superintendents and foremen. Electric power for the plant is supplied from a 3000-hp. station.

On the branch of the National Railroads the company has its own station, with a weighing scale for cars. After weighing they are sent to the railroad routing department, where they are passed over to the yard superintendent for shipment.

The purchase of the Durango ore mountain will make the plant self-contained as to ore supply. In due time the coke ovens will again be in production. The company has an interest in coal deposits, which probably will be worked eventually. Coal has been obtained from nearby mines. Limestone is gotten from practically inexhaustible quarries. Manganese of 35 to 40 per cent quality is obtained from the Salinas region. There is also an abundance of fluorspar situated not far from the plant.

TO TAX CORPORATIONS

Plans of Congressmen to Meet Needs of Government—Tariff Legislation

WASHINGTON, Dec. 28.—Repeal of the excess profits tax by the special session of the Sixty-seventh Congress next spring, will be followed by an increase in the normal corporation tax and probably an additional tax upon undivided earnings.

This is the outstanding development of a month of Congressional discussions and committee hearings. The ways and means committee of the House of Representatives which will frame the new taxation law—all revenue bills must originate in the House—has practically abandoned the various sales tax proposals. This rejection is not based on any inherent weakness in the sales tax, but chiefly on the political reason that it would be difficult to win popular support for a measure that removed an excess profits tax from corporations and put a consumption tax in its place. For this reason the House members are agreed that the substitute tax must be put on the corporations and the Senate finance committee is expected to follow the same course of reasoning.

Proposed Tax on Earnings

Varied suggestions have been made by members of the House committee for the new corporation tax. Some of the members, including Chairman Fordney, favor the adoption of a straight 15 or 16 per cent tax on corporation earnings, without a tax on undistributed earnings. Others favor the retention of the present 10 per cent tax, coupled with a tax on undistributed earnings. The treasury officials have estimated that a 16 per cent corporation tax would net the same revenue as the present 10 per cent tax and the excess profits tax combined. Not to tax undistributed corporation earnings would favor the latter as against individual and partnership business concerns. As a result, it is expected that there will be a compromise in the shape of an increased corporation tax—possibly as high as 15 per cent—and a moderate tax on undistributed earnings.

The Agricultural Bill

All of this, however, applies to the special session to meet in the spring. The present Congress is not expected to touch taxation problems at all. The House passed a special agricultural tariff bill last week because of the pressure from the farmers, but the Senate seems unlikely to accept this measure. The Senate finance committee will not touch the bill until some time next week. There is talk of holding hearings then, but even this is doubtful. The Republicans have a majority of only one vote in the present Senate and there is a growing feeling that President Wilson would veto such a measure if it were sent to him. As a result, it is doubtful whether the Senate will spend much of the remaining few weeks of its life on a bill which it considers doomed.

Some headway has been made by the proponents of the re-enactment of the Aldrich-Payne or Dingley tariff schedules at the beginning of the special session to act as an anti-dumping bill until a real revised tariff bill can be passed. Chairman Fordney announced in last week's debates that he favored such a plan, and it is possible that the Senate leaders will agree. So far, however, they have not accepted the proposal.

Blaming Secretary Houston

The possibility of the passage of bonus legislation, with its plan for an expenditure of $1,500,000,000 from a depleted treasury, met a new setback last week under a vigorous attack by Secretary Houston of the Treasury department. The Senate leaders would like to kill the measure if they can find an excuse for doing so, but so far there has been a marked hesitancy about permitting it to go to a roll call. Now they can lay the blame on Secretary Houston, and they probably will.

Secretary Houston also punctured the plan to revive the War Finance Corporation as a basis for the extension of foreign credits to help the farmers. He pointed out that such a credit extension would require heavy treasury borrowing—already a most expensive undertaking—and it is expected that he will recommend that President Wilson veto the measure.

The Edmonds bill, for the relief of income tax payers who failed to pay the Dec. 15 installment on time, has been withdrawn by the ways and means committee of the House and is considered dead. Treasury officials pointed out that it was so loosely drawn that it might remit the penalties of all income tax delinquents and lead to endless tangles. Secretary Houston also announced that the payments under the Dec. 15 installment exceeded the original estimate of $650,000,000, so that no vital emergency exists.

O. F. S.

Testing Hardness of Bearings and Journals

Instrument Developed Using Point So Hard and Fine That Hardness of Individual Crystals of Steel Can Be Tested

DETAILS of an instrument known as a microcharacter developed for testing the hardness of bearing alloys and adaptable also for testing all the steels suitable for journals, was given in a progress report of a sub-committee on bearing metals of the American Society of Mechanical Engineers at the recent annual meeting in New York. A tentative scale of so-called microhardness that expresses in definite units the relation of the hardness between different materials was also submitted by the committee (C. H. Bierbaum, vice-president Lumen Bearing Co., Buffalo, N. Y., chairman; J. A. Capp, testing laboratories, General Electric Co., and H. Diederichs, professor experimental engineering, Sibley College, Cornell University). The report substantially in full follows:

The importance of studying the physical properties of the individual crystals of the bearing alloys was very forcibly demonstrated by one of our early experiments, as illustrated by the photomicrographs shown in Figs. 1 to 4. Fig. 1 shows a small part of the surface of a bearing bronze, a copper-tin alloy, which had first been ground and polished and then strongly etched with ammonium persulphate. This left the copper-tin delta crystal unaffected and in pronounced relief, while the portions containing a higher percentage of copper were etched to proportionately greater depths, the deeper surfaces corresponding to the alpha and the intermediate to the beta crystals. A small piece of cold-rolled steel shafting was then ground and highly polished—a steel containing 0.12 per cent of carbon, and having a Brinell hardness of 175 and a scleroscope hardness of 24. The etched bronze surface was placed in a crosswise position upon this polished steel surface and then subjected to a pressure of 50,000 lb. per sq. in. of contact area. Figs. 2 and 3 show the edges of the steel surface where the bronze had overlapped. They both show a distinct indentation made by the delta crystal into the steel. The larger part of the steel surface, say 95 per cent, remained entirely unaffected and retained its original polish, which seemed strange in view of the heavy load to which these surfaces had been subjected. But upon examining the condition of the bronze surface, matters seemed to be accounted for. The softer or plastic crystals of the bronze had allowed the harder ones to become embedded in them, and thus as shown in Fig. 4 the surface originally shown in Fig. 1 has the order of the surface crystals completely reversed, that is, the alpha crystal which had been deeply etched out is now in bold relief, as shown by the surfaces, the areas in focus; and the delta crystal which was originally in relief is now distinctly intaglio. This of course is possible only in an alloy whose various constituents possess varying degrees of hardness. The fact that the bearing bronze had constituent elements harder than the steel shaft seemed remarkable.

The importance of a knowledge of the microcharacteristics of alloys is not new. It has been fully appreciated by many of the early investigators who first applied the use of the microscope to the study of alloys, as is shown in their early work. The only means for this study until now, however, has been the needle point, and when this is compared with the finest of the sapphire points, which have been successfully ground for our latest instrument, the microcharacter, the contrast becomes striking. Fig. 5 shows the end of a micro-cut in soft steel with a sapphire point under a magnification of 2000 diameters, while Fig. 6 shows under exactly the same magnification a shadowgraph of the point of the finest cambric needle, Sharps No. 12. A comparison of the two shows that a refinement of at least a thousand-fold has been effected. In addition, the hardness of the sapphire as compared with steel offers a means for testing the hardness of the individual crystals of which the steel needle is composed. The fact that these sapphire points have been accurately ground and mounted according to definite specifications and can now be perfectly duplicated, makes it possible to supply various investigators with a standard instrument for doing our work in a manner that permits direct comparison of results.

Fig. 7 shows the instrument complete, mounted

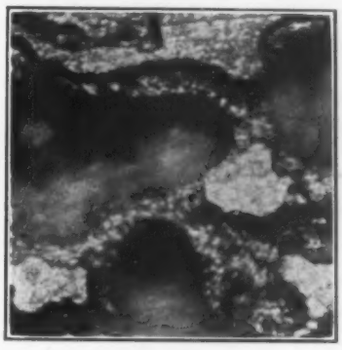


Fig. 1, above—Photomicrograph of an Etched Bearing Bronze Surface, a Copper-Tin Alloy, at 300 Magnifications. The copper-tin delta crystals are unaffected and in relief

Fig. 3, below at left—Another Portion of the Shafting Surface Shown in Fig. 2. Both Figs. 1 and 2 show the edges of the steel surface where the bronze had overlapped and the indentations made by the delta crystals into the steel

Fig. 2, above at right—Surface of Cold-Rolled Steel Shafting with the Copper-Tin Delta Crystal Impressed upon It. 300 magnifications

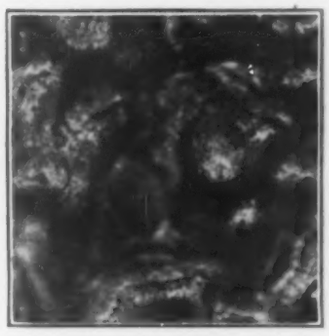
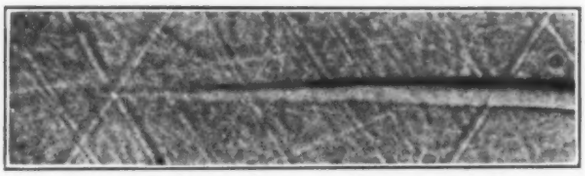


Fig. 4, below at right—Same Surface as Fig. 1 After Being Subjected to a Pressure of 50,000 Lb. per Sq. In.



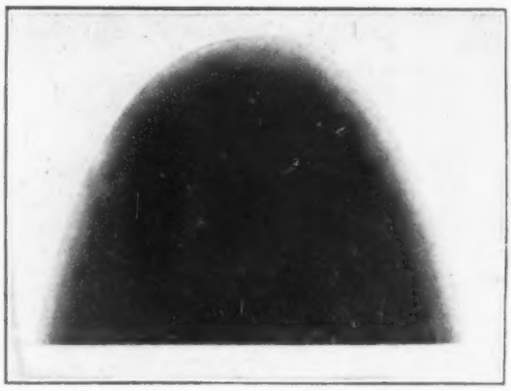


Fig. 5, left—Photomicrograph of Steel Surface Showing End of Micro-Cut. 2000 magnifications

Fig. 6, left — Shadowgraph Showing the Point of Finest Cambric Needle—Sharps No. 12. 2000 magnifications

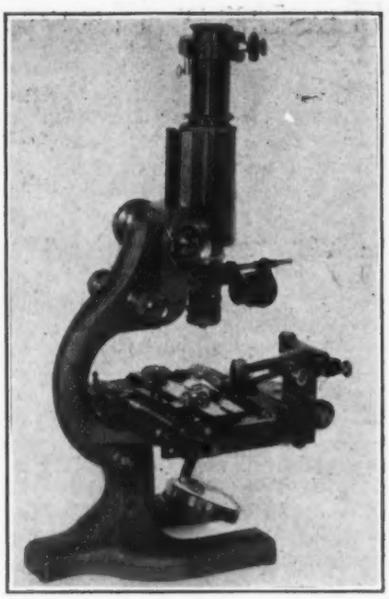


Fig. 7, right—Microscope Complete with Micro-character Attached

upon the stage of an ordinary microscope, the latter being equipped for work with a vertical illuminator with condensing lenses and an ocular provided with a movable micrometer scale. Fig. 8 shows the micro-character separate from the microscope with the jewel suspension bracket swung out. At the left is seen the worm gear for the micrometer feed, the handle of which is rotated when making a cut at the rate of, say, 30 r.p.m., which gives a very slow and continuous feed to the jewel point. Fig. 9 shows the jewel suspension. The jewel is mounted in a delicate steel spring directly beneath the point of application of the weight; it is suspended slightly above its center of gravity on sapphire jewels, and the left end is provided with a spirit level.

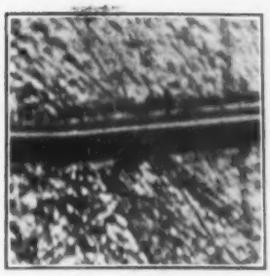
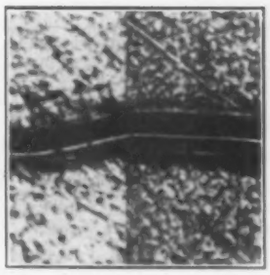
The distinctive features of our instrument are: first, the extreme refinement of the shape and proportions of the jewel point; second, the special advantages due to the particular shape of the point; third, the micrometer feed for the jewel point; and fourth, the elastic mounting of the jewel point. We have found that the material for the jewel point, the artificial white sapphire (fused Al_2O_3), is very satisfactory and seems to meet all requirements for hardness and toughness. The shape of the point, a corner of a cube, accurately mounted so that the three facets make equal angles with the test surface, with one edge of the cube advancing in direct line of motion, seems to possess special advantages. The advance edge of the cube and the line of cut form an angle of 35.26 deg., the *angle of incision*, which insures that the normal pressure upon a crystal is always greater than the transverse pull, thus completely eliminating the objectionable tearing effects of a sharp conical point; moreover, we have thus far been entirely unable to grind a round conical point to the same degree of accuracy as one made by grinding three intersecting plain surfaces. Fig. 10 shows two views of this jewel point: an end view (1) showing the three facets ground at an angle of 54.73 deg. with the axis, each facet being ground after rotating the jewel upon its axis 120 deg.; and a side view (2) the lower edge at the right being the advance or cutting edge. To start with, the jewel is a small cylinder, say, 0.022 in. in diameter and 3/32 in. long, and the point is ground and tested before the jewel is mounted. The mounting is done by accurately clamping both the jewel and the jewel spring in a fixture while in the field of the microscope. A heavy solution of specially refined shellac is then applied to the point on the lower side of the spring and permitted to harden. The spring is then removed from the jig and a small amount of this shellac is applied to the jewel on the upper side of the spring. After this has hardened the excessive top length of the jewel is ground off in order to reduce its weight to an absolute minimum. Alcohol should therefore never be used in cleaning the point, xyline being the most desirable solvent to employ. Early in our work it was found that the jewel point should move at a slow and constant rate in order to insure corroborative results. This requirement has been met by means of a worm gear. The rate of travel should be so slow that no additional indentation is effected by stopping. At the same time it was shown that the cutting point should be held in such a manner that the point while passing suddenly from one crystal into another, could instantly take a new position without having to overcome excessive inertia of moving parts. Accordingly the jewel itself is reduced in weight as much as possible and is mounted in the end of an elastic steel blade which tapers evenly toward the jewel point.

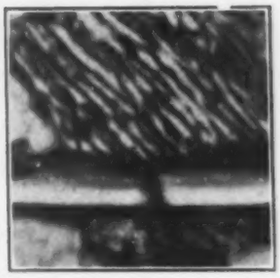
It was found desirable to lubricate the test surfaces, and watch or porpoise-jaw oil was at first used for this purpose. It was found, however, to be difficult to completely remove this oil, and with the application of immersion oil, which is not miscible with watch oil, optical difficulties were encountered, since all measurements are made with the high-power immersion objectives. The immersion oil used is the standard optical cedar oil having a specific gravity of 0.976 at 15 deg. cent. The same oil may now be left upon the surface while making the necessary measurements, after which the oil may be left to dry upon the specimen and so form an effective coating against corrosion. The jewel point should be kept clean and should be cleaned immediately after use, since a small amount of oil dried on alone or in connection with other material may produce very erratic and unaccountable results, even though this dried-on material be so small as to be barely visible. We have found that elderberry pith wetted with xylol is a very desirable material for cleaning the jewel point. This pith is also very suitable for wiping off the test surfaces after a cut has been made, since a freshly cut surface of this material will not scratch or mar the test surfaces and will carry away the loose chips made by the cut.

Many crystals of a known definite chemical composition could be tested in bulk without resorting to the extreme refinements here entered into, but all crystals formed due to a varying degree of solubility of constituents under varying temperature, together with the various eutectic formations in general, demand the utmost refinement in this work.

A three-gram weight seems to be the lightest that will make a sufficient impression upon the hardest crystals that have to be taken into consideration in our work, and at the same time give a reading the measurement of which shall be possible and within the limits of the modern microscope.

A proposed Scale of Microhardness is shown in Fig. 11. It is a curve plotted on two rectangular coordinates; the readings of the widths of cuts are given on the X-axis and the corresponding degrees of hardness are given on the Y-axis. The micron, a thou-



Figs. 12 to 16, Reading from Left to Right: Fig. 12.—Micro-cut in two adjacent grains having the same hardness. Pure copper. 800 magnifications. Fig. 13.—Micro-cut on same crystals as Fig. 12, showing difference in hardness. 800 magnifications. Fig. 14.—Micro-cut showing difference of hardness of bronze and fused tin oxide. 1000 magnifications. Fig. 15.—Micro-cut in soft steel showing hardness of ferrite and pearlite. 1500 magnifications. Fig. 16.—Micro-cut in hardened steel showing micro-cut in the martensite formation. 2000 magnifications.

sandth of a millimeter and a unit commonly used in physics, seems for our purpose to be a convenient unit of length and as such is usually represented by the character μ. For the reason that the various cross-sections of micro-cuts in the different materials are symmetrical and have areas proportional to the squares of their widths, these squares should be taken into consideration; and for the reason that the material which has the narrower micro-cut is the harder, the reciprocals of the squares should be used. Now, if we let κ be the michrohardness and λ the reading for the different widths of micro-cuts, in terms of microns, and if we then multiply the reciprocal of the square by 10 raised to a convenient power, we have $\kappa = \lambda^{-2}10^4$. This formula has been plotted and is shown in Fig. 11. We believe that in this work we have been the first to succeed in establishing a rational scale of hardness, one that expresses in definite units the relation of the hardness between different materials.

The hardness of some materials varies considerably in different directions. For example, we find this property illustrated in Figs. 12 and 13, both of which show a micro-cut across the surface of chemically pure copper. In the first we have practically a uniform width of cut, although the cut is made across the border line of two adjacent grains. In Fig. 13 we have a cut in a different direction at a different point, of the same two grains, and we have an appreciable difference in hardness of the two grains as shown by the width of micro-cut. This is due to the different crystalline orientation in the grains.

Fig. 14 shows a micro-cut across a portion of fused tin oxide crystal embedded in brone. The difference in the width of the cut indicates a difference in hardness between the two materials. Fig. 15 shows a micro-cut over the surface of a soft steel, passing through a pearlite crystal. The square of the width of the cut at the right shows the relative hardness of the ferrite crystal as compared to the narrow part of the cut, that of pearlite.

Fig. 16 shows a micro-cut across a martensite structure in hardened tool steel. "It is undoubtedly the hard-

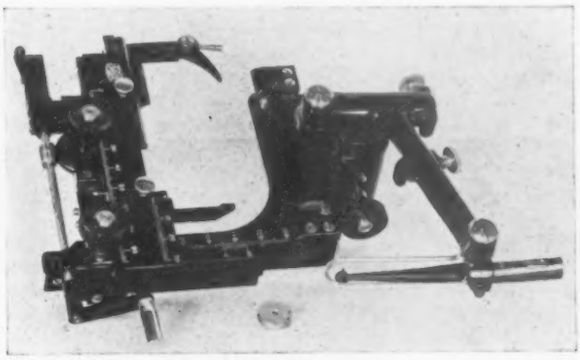


Fig. 8, above—The Microcharacter Designed for Testing Hardness of Bearings and Journals

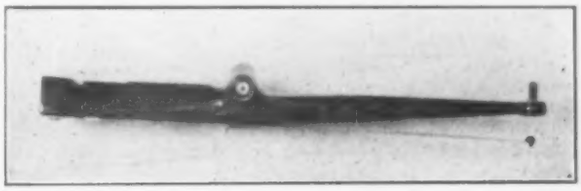
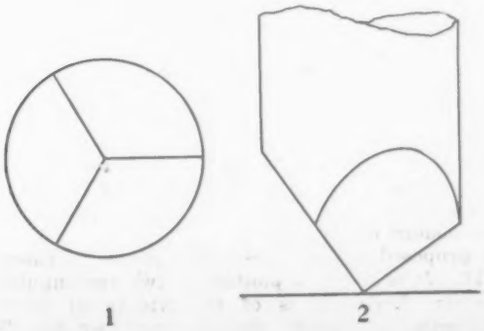
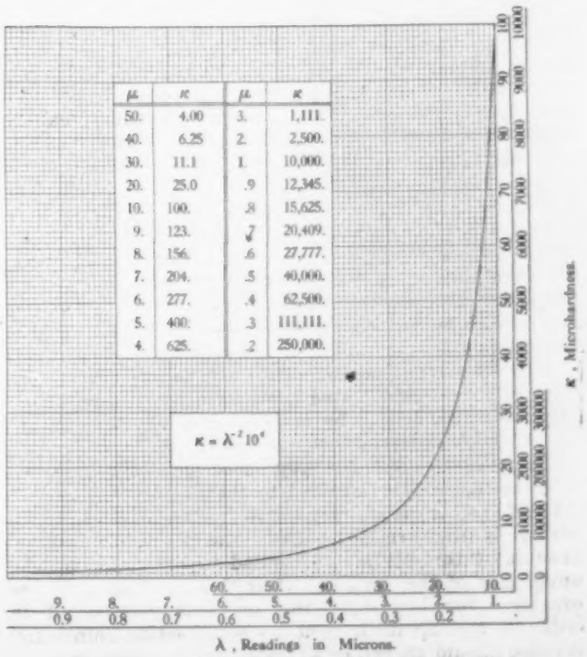


Fig. 9, right—Jewel Suspension of the Microcharacter

Fig. 10, below—Details of the Jewel Point, an Artificial White Sapphire

Fig. 11, right—Diagram of Scale of Microhardness.





est constituent of hardened steel," says the report.

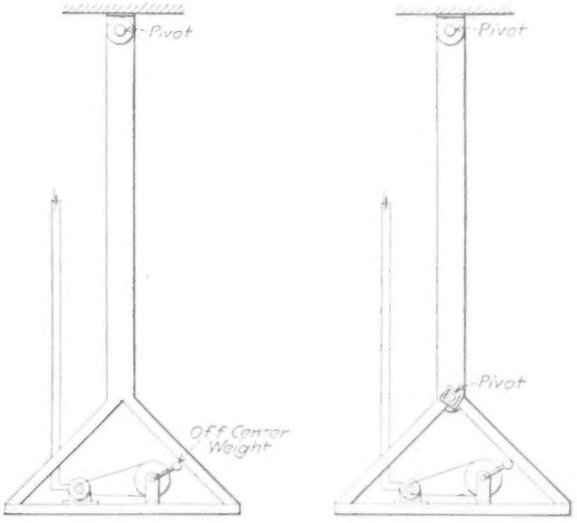
From what has gone before it must be evident that our instrument is adapted for a very wide range of testing, including not only the various bearing alloys, but also all the steels suitable for journals, whether hardened or soft.

Foundation Design to Eliminate Vibration

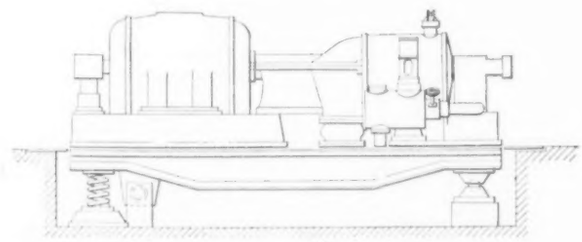
Substructures for Engines and Machinery to Keep Synchronous Speeds Below Operating Speeds

AN interesting paper on foundations for machinery was presented by N. W. Akimoff, manufacturer of balancing machinery, Philadelphia, at the meeting of the American Society of Mechanical Engineers, New York, Dec. 8. The object of the paper, as stated by the author, was to point out some definite lines along which a rational theory of substructures for engines and moving machinery can in general be built up.

It was explained that vibrations are caused by two distinct orders of agencies: Those due to unbalance,



At the Left, a System with One Degree of Freedom, and a System with Two Degrees of Freedom, One of Which May Be Suppressed. Below, Foundation for a Turbo-Generator Designed to Eliminate Vibration



or, more correctly, lack of running balance, and those due to causes other than unbalance. Unbalance, he said, can be easily corrected in the construction of the machinery, but that there are many causes independent of balance likely to result in vibrations, as for instance, "whipping" of a crankshaft, armature, turbine rotor, etc.; water in a steam turbine; peculiarities of the reciprocating mechanism as for instance, a 4-cylinder or an 8-cylinder V-type engine where certain forces do not cancel out and where running balance alone is not conducive to perfect results; or torsional vibrations, which under certain conditions produce an effect very similar to that of unbalance.

A free body, the speaker continued, is said to possess six degrees of freedom, three along the three mutually perpendicular axes drawn through any point, within or without the body, and three about these same axes. "By fixing one point of the body we suppress all bodily motion along any three axes through this point, but we still have three degrees of freedom, that is, freedom of angular displacement about any or all three axes."

Mr. Akimoff discussed some well known effects of vibrations on various types of apparatus: In large power plants where the main units are of the modern turbo-generating type the steam mains have been known to burst, due to rough running, that is, vibration; the operation of a printing plant is often extremely unpleasant for adjoining dwellings and inspection often reveals that machinery in such plants is firmly secured to massive foundations and the owners are at a loss as to how to remedy the trouble; within the building itself, the action of machinery is often felt; an internal-combustion engine often exhibits a certain amount of vibration which can be felt all over the understructure. "The point we wish to emphasize," he said, "is that in an understructure too much rigidity is as harmful as too much freedom to yield. We are now ready to formulate the new criterion of 'stability' for foundations. Stability is here characterized by remoteness of the operative speed from any one of the several synchronous speeds at which the frequency of the operative speed would be nearly, or exactly, equal to the frequency of the free oscillation of the system, if displaced from natural state of rest and let go.

"How many distinct synchronous speeds a system is capable of having depends upon the number of degrees of freedom. A system with one fixed point may have only three such synchronous speeds, while a system mounted to rotate about an axis can have only one such speed or 'period,' as it is often termed. If we could control these synchronous speeds, so as to make sure that none comes anywhere near the actual speed of operation of the machine, we would then have a fairly complete solution of our problem."

To illustrate the foregoing points, the speaker considered an experiment with a pendulum. The pendulum, shown in the accompanying illustration, consists of a platform rigidly connected to an upright free to swing about the pivot point shown. A small motor fastened on the platform operates a countershaft carrying an off-center weight. The motor is fed through a suitable flexible connection and it is always possible to adjust the speed of the countershaft carrying the weight so that the number of revolution per minute of the former will be equal to the number of double oscillations per minute of the pendular system, if the latter is slightly displaced from its vertical position of equilibrium and let go. The effect of this adjustment of speed will be the so-called "synchronism" and the extent of swing (amplitude) of the pendular system, in general very slight for arbitrary values of the rotative speed of the weight, now become violent, in fact out of all proportion to the magnitude of the weight itself.

In the vicinity of synchronous speed, both above and below, the amplitude drops down to a value almost insignificant, so that if the weight is small the system appears to be practically at rest. Furthermore, any further increase of speed will not produce any effect. This system has one degree of freedom. By pivoting the triangular portion of the device as shown in the right hand illustration, a system with two degrees of freedom is introduced which is readily convertible to the system of one degree of freedom by tightening the nut holding the triangle to the upright piece. With

the nut tightened and with synchronous speed of say 100 r.p.m. the pendulum will oscillate violently. When the nut is loosened, introducing an additional degree of freedom, the amplitude decreases practically to zero. If the speed is reduced considerably, say to 50 r.p.m., violent oscillations of the whole system will reappear, as likewise will be the case in speeding up the countershaft, say to 150 r.p.m. These figures, the speaker stated, were purely illustrative; whether they will actually correspond to exact facts will of course depend upon the characteristics of the system.

"In other words," Mr. Akimoff said, "by introducing an additional degree of freedom we have accomplished this double result. What was synchronous speed for a system with a single degree of freedom is no longer synchronous speed for the same system provided with an additional degree of freedom; the new system has two frequencies of oscillation, at which it is sensitive to disturbing influences (such as centrifugal action of the weight), one being below and the other above the value corresponding to that of the same system with the additional degree of freedom suppressed.

"It should especially be observed that the oscillations were thus reduced practically to zero, not by steadying the system by something without it, but by some sort of an adjustment wholly within the vibrating system itself. Furthermore, what we did was to increase in a measure the flexibility of the system by breaking it in two; and although at first glance this might have increased the effects of the disturbing agency (rotation of off-center weight) the actual effect was practically to bring the system to rest. It is still more important, however, to note the fact that we introduced the additional degree of freedom precisely in the sense of action of the disturbing agency, that is, in the sense of the plane of the figure and not at right angles thereto; or say, in an up-and-down sense, as for instance by providing a coil spring instead of joint.

The Basis of Foundation Design

"This, then, will be taken as basis for our further discussion. In contemplating the design of a foundation we shall always separate those directions (or axes of instantaneous rotation) about which the system cannot (or at least is not likely to) oscillate from those directions (or instantaneous axes) about which the system is more or less certain to vibrate. We next shall select a 'steady' point from purely practical considerations, and finally devise such means of controlling the 'free periods' of the system as will secure the desired degree of remoteness from synchronism under the actual operative speed. Such means of course will be springs, exceedingly heavy, and not in the least calculated to allow of any free wabbling of the system. They will also be adjustable so that the desired periods may be readily varied within wide limits; and in general structurally arranged to introduce as few changes as possible in the arrangement as a whole."

Mr. Akimoff stated that to submit too many particulars as regards the detailed designs of such an arrangement would defeat the purpose of the paper, which was merely to introduce the broad idea and not any one of the scores of individual designs which might readily suggest themselves to the engineer confronted with the problem of designing a foundation for a given machine. "Considering, therefore," he said, "only one of apparatus, a turbo-generator, we must start out with the selection of the steady point. We will naturally place it as near the steam main as possible (not to the exclusion, of course, of a suitable expansion joint), as under all conditions, should there be a choice of position, preference should be given to that point as far as possible from the center of gravity of the system, so that any static unbalance (whipping, etc.), would be made to act not as a force *upon*, but as a movement *about* that steady point. Such point should actually be made as steady as possible and no trouble should be spared in providing suitable piling or digging down to the solid ground and constructing suitable footings.

"The next problem is to design a substructure adapted to receive the bedplate of the apparatus and made stiff enough so as to eliminate any 'periods' of its own. This bedplate may be made of structural steel or of reinforced concrete, in which latter case the ends thereof may be made of cast iron. The substructure is supported upon the steady point either by a ball-and-socket arrangement, or is simply bolted at that point to the floor plate underneath by a bolt which need not necessarily be very light, but which must be arranged in a manner to secure the minimum area of actual contact.

"Remembering that in apparatus of this sort the tendency to oscillate about the horizontal axis is always rather negligible, we have practically only two degrees of freedom and only two periods to adjust so as to have them well out of the limits of the operative speed. Hence the two sets of springs, one to take care of the period corresponding to oscillation in the vertical plane, the other to control motion in the horizontal plane. It should not be imagined, however, that these springs will necessarily be very light; they will always have considerable stiffness, but their function is that of being the only members that *can* yield and the whole situation is controlled by the proper choice of these yielding elements."

To Protest Against a National Board of Adjustment

The demand of the railway brotherhoods that a National Board of Adjustment shall handle all labor problems instead of the individual company settling its own troubles, as formerly, will be protested at a convention of manufacturers, merchants, railway executives and shippers at Chicago, Jan. 12. About 500 delegates, representing all sections of the country, are expected to attend the meeting at the Congress Hotel.

Acquiescence in the railway brotherhoods' plan would mean the opening wedge for collective bargaining and the closed shop in all branches of American industry, according to the convention call issued by the National Conference of State Manufacturers' Associations, through its president, William Butterworth, who is also a director of the Illinois Manufacturers' Association, vice-president of the Chamber of Commerce of the United States, and the president of Deere & Co., Moline, Ill.; and the secretary, John M. Glenn, who holds the same position with the Illinois Manufacturers' Association.

In explaining the primal purpose of the convention the call says, in part:

"The railway brotherhoods are insisting upon the creation of a National Adjustment Board. The railway executives are opposing it because, if created, it means the nationalization of railways under the domination of the labor unions, and the destruction of discipline, efficiency and loyalty, which are necessary to the efficient and economical operation of the common carriers for the benefit of the people. If the railroads are thus shackled, the resulting conditions must necessarily be reflected in the organization of every manufacturer. It means the closed shop and union domination over all industries alike. This, to-day, is perhaps the most vital issue facing the manufacturing and producing interests of the United States, and should have immediate attention."

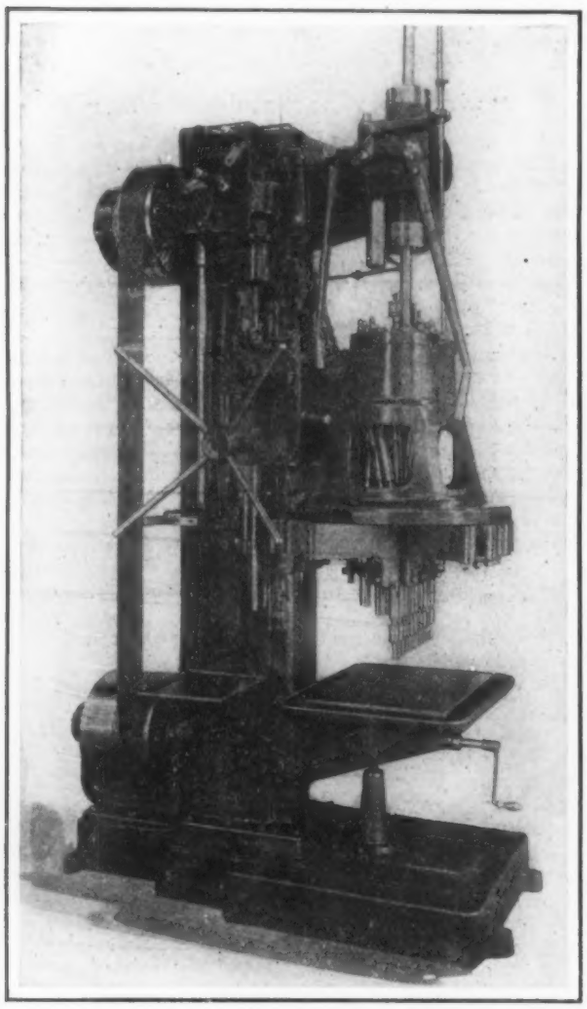
A discussion of the open shop, its effect on employee, company, production, cost of production, and union labor, is also scheduled. The immigration problem, particularly vital at this time, will be considered in all its phases. Among the points discussed will be: Should America's real human interest in the immigrant begin before he leaves his home country? Can the reception of the immigrant in this country be improved upon, and how? Can a better plan be found for placing the immigrant in the right place with the right surroundings, and can uniform methods of educating and Americanizing the foreigner be adopted?

Many prominent men have been invited to address the convention, including—Elbert H. Gary, United States Steel Corporation, New York; Charles M. Schwab, Bethlehem Steel Co.; John D. Ryan, Anaconda Copper Co., New York and Butte, Mont.; Charles Piez, president Link-Belt Co., Chicago; George M. Gillette, Minneapolis Steel & Machinery Co., Minneapolis, and F. T. Bentley, Illinois Steel Co., Chicago.

Multiple Spindle Drilling and Tapping Machine

A multiple drilling and tapping machine, developed by the Fox Machine Co., Jackson, Mich., has a number of new features. The drive operates through a single drive plate friction clutch, similar to the Hoosier, Borg and Beck and other standard automobile clutches, the clutch being located on the outer end of the upper cone. At the head of the vertical drive shaft is a 12-jawed positive driving clutch, with right hand teeth on one side and left hand teeth on the other. These teeth engage opposing members carried by bevel gears, the gears being driven by a bevel pinion mounted on the horizontal shaft, which in turn runs into the speed change box.

The movement of the clutch from forward to reverse is controlled by a lever at the front of the machine which is also connected to the lever controlling the friction clutch. When the tapping lever is moved from forward to reverse, or vice versa, the first movement of the lever disengages the friction clutch. Further motion of the lever carries the solid tooth driving clutch to the opposite position, this being accomplished while the power is off. As the lever movement is continued, the friction clutch is again engaged, driving the spindles in the reverse direction. Special provision is made against the possibility of the teeth of the jaw clutch striking one on top of the other while being reversed.



A Single Drive Plate Friction Clutch on Outer End of the Upper Cone and a 12-Jawed Positive Driving Clutch at the Head of the Vertical Drive Shaft Are Features of New Fox Multiple Drilling and Tapping Machine

A stop is provided that may be set so that when the taps have reached a desired depth, the machine automatically operates the reversing spindle, relieving the operator of the responsibility of reversing the machine at the proper moment. The machine is ball-bearing throughout.

MANY MILLS IDLE

Youngstown Plants of Independents Operating at Reduced Capacity—Market Is Dull

YOUNGSTOWN, OHIO, Dec. 28.—Iron and steel industry of the Mahoning Valley faces the New Year with operating schedules at a largely reduced rate and new business reduced to small proportions. "I expect business to be fair after the first quarter," states a leading manufacturer, "but during the next three months operations are likely to be more or less intermittent." Until this time the volume of unemployment has been held down, though there has been considerable partial employment. Sheet business is confined to small tonnages and rollings are at a low ebb this week. In fact, most of the sheet mills in the Valleys are idle. Sharp declines in tonnage rates paid puddlers and sheet and tin mill workers are expected to materialize from the bi-monthly settlement to determine the rates for the January-February period. Examination of sales sheets will occur this week between representatives of the companies and the Amalamated Association of Iron, Steel and Tin Workers. A feature of the sheet market during the past week was the appearance of an inquiry for 4,000 tons of black sheets for export shipment.

No. 4 blast furnace at the Ohio Works of the Carnegie Steel Co. has resumed after a suspension for repairs and overhauling and this interest now has all six stacks in this battery active. Its operations are close to normal and are far better than those of the independents.

Usual absence of buying is manifest at the close of the year and manufacturers approach the first quarter of 1921 with varying views on the trade outlook. It is the general opinion in the trade, however, that buying will be slack for the next three months and that a sustained revival will hardly come before spring. Those interests with a diversity of products are of course in the best position to meet such a contingency, and especially tube manufacturers whose unfilled tonnage will maintain schedules for several months.

In the meantime, mills are engaged reducing inventories as much as limited production will permit and some output is moving at an actual loss. Sales departments are eager for what limited business is in sight.

Pipe at Corporation Prices

Steel pipe is approaching the Steel Corporation level and a leading independent interest is reported to have taken a contract for spring delivery at the quotation of the leading interest. Heretofore a premium of $7 per ton has been maintained by the independents. All products are now obtainable from the independents at the Corporation level. For several weeks there has been pressure on the part of pipe consumers to force lower quotations from the independents, basing their claims on the reduced costs of raw materials. The principal demand for tubular products comes from Texas and California oil fields and from export interests. Much of the pipe produced by a district interest has been shipped to Japan in the past two months. Stocks of buttweld pipe are still low despite the improvement in deliveries. Demand, while not as firm as two weeks ago, is still well sustained.

An important development in the tin plate market is in inquiries from Japan, which aggregated 75,000 base boxes in the past two weeks. Current new business, though, is negligible.

Fuel Prices Lower

Fuel prices reflect the weakness of the steel market all along the line. One interest operating its own coal mines has been selling part of its product on the open market. Industrial buyers say high-grade gas coal is obtainable under $3.65 f.o.b. mine. Deliveries to the leading interests are now being made under contracts running to April in some cases, contract prices averaging around the present spot market. Standard furnace coke is nominally between $5.50 and $6 and weak at these prices. One transaction is reported at $5, though this was negotiated to dispose of a tonnage on wheels.

Electric Blooming Mill in Delaware

Penn Seaboard Steel Corporation Makes Wide Variety of Products — Billets Now Made Where Steel Castings Were Formerly

UNUSUAL diversity of product characterizes the operations of the Penn Seaboard Steel Corporation (and its subsidiary, the Tacony Steel Co.). The company offers to the marine field both heavy and light forgings as well as marine steel castings; to the locomotive industries, large and small steel forgings and steel castings; to the automobile industries, special alloy steel bars and shapes as well as large forgings and castings; and to general steel consumers, special steel billets and miscellaneous alloy and carbon steel bars and shapes as well as jobbing and machinery steel castings.

In February, 1920, the Penn Seaboard Steel Corporation consolidated with the Tacony Steel Co. The headquarters of the consolidated interests are in the Franklin Bank Building, Philadelphia, and the three plants are all located on the Delaware river. Its steel casting operations are confined to the plant at Chester, Pa., which was at one time the Penn Steel Casting & Machine Co., a pioneer in the acid open-hearth steel casting industry. At this plant all varieties of steel castings for battleships, steamships, ordnance work, locomotive work and miscellaneous uses are produced.

Its forging plant and finishing mills are at Tacony, Pa., where is combined the rolling mill unit of the Tacony Steel Co. and the ordnance or forging plant with its own steel department of what was once the Tacony Ordnance Corporation built for the Government and later combined with the Tacony Steel Co.

Its steel plant is located at New Castle, Del., and operates exclusively in producing billets, blooms and slabs, of all grades of alloy and carbon steels, either for its own use at the Tacony Steel Co. or for sale in the open market, in which a large business is done.

The New Castle plant, located a few miles south of Wilmington, Del., was formerly the Baldt Steel Co. and was founded in 1904 by Fred Baldt, one of the pioneers of the steel foundry industry. In 1916 the Baldt plant was consolidated with the Penn Steel Casting & Machine Co. and the Seaboard Steel Casting Co. of Chester, the consolidation being known as the Penn Seaboard Steel Corporation, the present company. The New Castle plant was greatly enlarged in 1916 to take care of Government contracts. It was further enlarged in February, 1920, after the Penn Seaboard-Tacony merger. One of the substantial changes made by the new management was the conversion of the plate mill into a 34-in. blooming mill, the purpose for which it was originally intended.

The steel making capacity consists of six 30-ton open-hearth furnaces, four of which are basic and the other two acid bottoms. Both 17½ in. and 21 in. square ingots are cast in inverted type molds with sinkheads.

The soaking pit equipment consists of two four-hole gas-fired pits and two two-hole oil-fired pits. Each hole of the gas-fired pit will take six 17½ in. or four 21 in. ingots and the oil-fired pits six of either sized ingots. Producer gas for the heating of the gas pits is furnished from a gas house equipped with three Hughes mechanical gas producers, erected by Wellman-Seaver-Morgan Co., Cleveland. This gas house is equipped with modern machinery for handling coal and ashes.

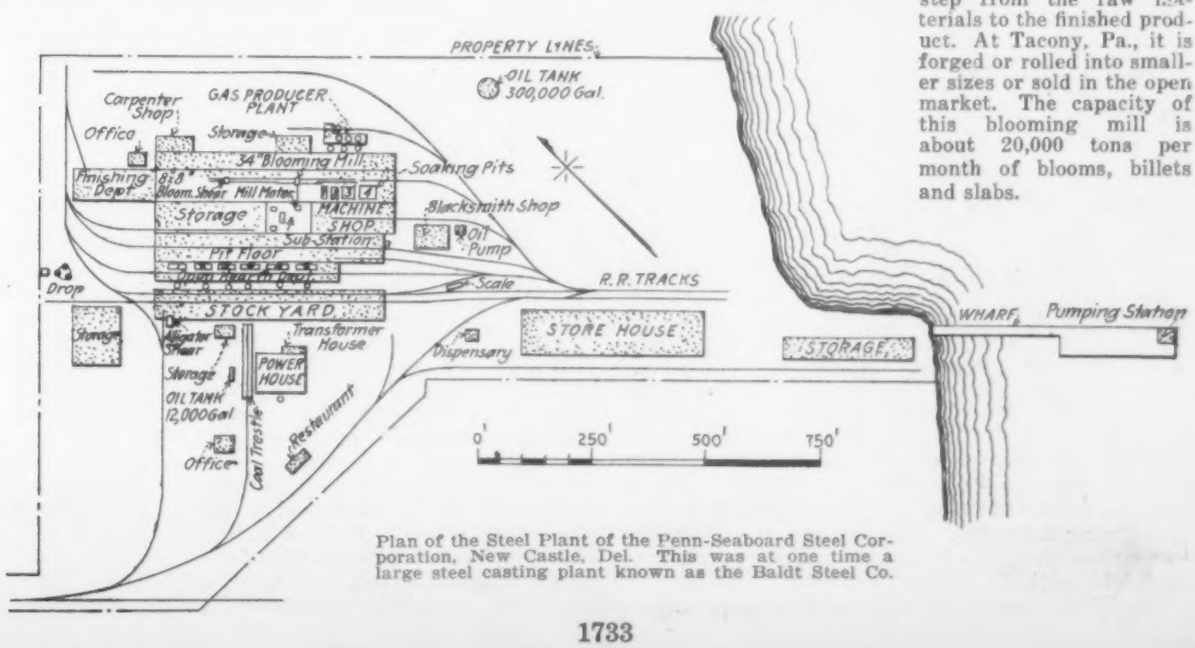
The rolling capacity consists of a 34-in., two-high reversing blooming mill, located in a building 700 ft. long with a span of 65 ft. The mill is driven by a Westinghouse direct-current reversing mill motor with a rated horsepower of 6000. This is operated by a 1500-hp. Westinghouse flywheel set. The auxiliary drives are General Electric direct-current mill type motors, receiving power from a 1000 kw. General Electric rotary convertor. The shear is of the guillotine type operated by a 150 hp. motor and is capable of shearing 8 in. x 8 in. The power is furnished by the Philadelphia & Wilmington Traction Co. It is received at 11,600 volts, 3-phase 60-cycle, and is stepped down to 2300 volts for transmission to the mill.

All departments are served by overhead traveling cranes, also a Morgan charging machine is used for charging the open-hearth furnaces, and Morgan charging and drawing cranes for the soaking pits.

The 17½-in. square ingot of alloy steel is broken down in 27 passes to 4 in. x 4 in. in less than 3 min. Very light drafts, with no ragging on the rolls, and frequent turning of the bar is the practice.

The products of this mill are all sizes of billets and blooms, 4 in. x 4 in. and upward to 18 in. x 8 in. slabs of special alloy and carbon steels. All products are of forging quality. Due to the use of inverted molds, with sinkheads, practically no piping or segregation is found, even in special alloy steels; and the surface of the finished product requires very little chipping.

The works laboratory is provided with modern apparatus for chemical analysis of all grades of special alloy steels. A constant check is made at each step from the raw materials to the finished product. At Tacony, Pa., it is forged or rolled into smaller sizes or sold in the open market. The capacity of this blooming mill is about 20,000 tons per month of blooms, billets and slabs.



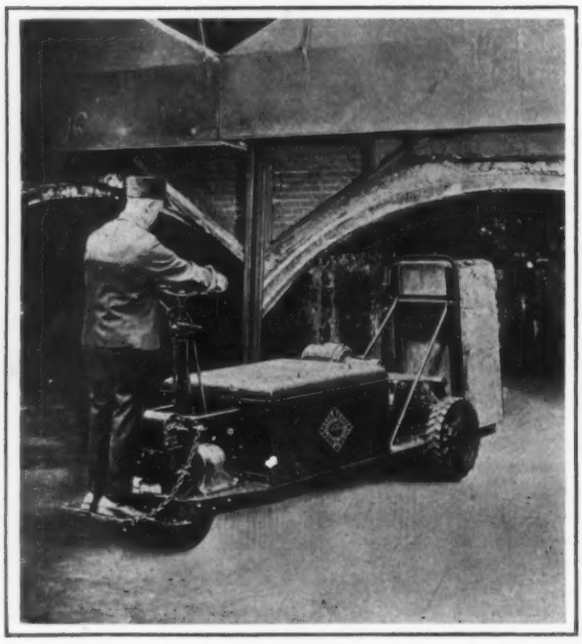
Plan of the Steel Plant of the Penn-Seaboard Steel Corporation, New Castle, Del. This was at one time a large steel casting plant known as the Baldt Steel Co.

Electric Truck for Charging Annealing Ovens

An important application of the electric storage battery truck in industrial plants has been made by the Elwell Parker Electric Co., Cleveland, which has brought out a new type of truck for charging annealing ovens in malleable iron foundries. Various devices have been used for charging annealing ovens, including the use of hand operated rigs, air operated charging trucks, electric trucks taking power from a trolley, combination of the air and trolley trucks, and a steam operated charging truck. Among the advantages claimed for the storage battery truck for this purpose are that it will serve the entire annealing department and oven floor space and can be run by an inexperienced operator.

Early in 1919 the Elwell Parker company adopted a truck design which incorporated suggestions by managers and engineers of malleable foundries. This type is now being manufactured from standardized parts, 75 per cent of which are used in the company's other types of electric trucks.

The truck has three wheels, one for steering and two for driving, and at its front is provided with an electrically operated annealing pot lifting device. The steering wheel is turned by an automobile type wheel mounted on the top of a vertical steering mast turning



Electric Storage Battery Truck Charging Annealing Oven

on ball bearings. The steered wheel is carried in a spring cradle so that the shock is cushioned when running over an obstruction. The wheels are equipped with rubber tires if the truck is to be used with ovens charged at low temperatures, or with a smooth steel wheel on the steering end and a pair of herringbone steel driving wheels on the drive end for use with ovens having high charging temperatures.

The operator stands on two pedals, one of which controls the brake. When this pedal is pushed down by the operator's left foot the brake is off. When the right pedal is depressed the circuit breaker closes, but only when the controller is in off position, connecting the controller to the battery carried in a compartment on the truck frame. The operator must stand on the truck to operate it, for if he steps off it stops automatically.

To operate the pot lifting device a switch is closed, the forks move close to the floor, the truck is driven forward and the forks inserted beneath the pot stool. Upon closing the switch the stool and pot are lifted 6 in., a trap stopping the lifting mechanism when a predetermined height is reached.

The lifting mechanism consists of a series wound motor which receives its power from the same battery as the propelling motor. This motor is equipped with a special brake and directly connected to a worm gear which drives a worm wheel mounted on the clutch spider. The center of the clutch, which is set for 25 per cent overload, is a nut through which a multi-thread worm or ram works. This ram is attached to a toggle lifting mechanism which raises or lowers the forks, depending upon the direction of motor rotation. Another safety feature is that the movement of the forks up or down may be stopped at any point by manually opening a switch so that the pots may not be upset if improperly picked up or placed. The lifting mechanism is inclosed and its working parts run at slow speed in oil.

The truck is driven by an inclosed motor direct connected to a worm gear which drives through a four bevel pinion differential to the wheels. The axle is of the full floating type. No weight is carried on the drive shafts. The wheels carry 7½-in. double row ball bearings. There is a contracting type brake between the motor and differential. The whole equipment is assembled on a heavy riveted steel frame. The over-all length of the truck is 12 ft. and weight complete with battery, 3600 lb.

The battery is charged at night and the truck is ready for use in the morning. It is stated that with a single charge of the battery the truck will make 150 to 200 trips, each trip including picking up, backing out, turning, traveling, setting down, and picking up another 4000 lb. pot and placing it in the next oven.

Griffin Wheel Co. Additions

Some additions are being made to the Tacoma, Wash., plant of the Griffin Wheel Co., main offices at Chicago, manufacturer of cast iron wheels. Seven new molding floors have been added to the Tacoma plant, making a total of 21, together with all necessary auxiliary equipment including cranes, blowers, elevators, etc. The plant is equipped with one 90-in. and one 100-in. cupolas, and has a capacity for turning out 725 cast iron wheels per day, ranging from 625 lb. to 725 lb. The company also has a brass foundry equipped with two Swartz and one Monarch brass melting furnaces, the capacity being five tons per day, consisting of locomotive and car brasses and small jobbing work. The company intends to install in the plant overhead tracks, self-pouring ladles and an exhaust system for drawing off all wheel grindings. An old foundry building now discarded will be torn down, and in its place will be erected a modern machine shop for which a large equipment of machine tools will be needed. The company is at present filling an order for 7200 cast iron wheels, weighing 700 lb. each, for the Southern Pacific Railroad.

Shipbuilding Plant Sold

The entire plant of the Ames Shipbuilding & Dry Dock Co., located on the West Waterway, Seattle, Wash., has been sold to the Seattle Contract Co. The sale includes all the machinery, equipment, stores and buildings, the Ames company retaining the land on which the plant is located. It is the intention of the purchaser to at once start dismantling the plant, selling off all materials, equipment and buildings. Reports that the Ames plant had been sold to the Barde Steel Products Co., of Seattle, for $1,250,000 are incorrect.

Bust of Charles A. Otis Installed

A bust of Charles A. Otis, pioneer steel manufacturer of Cleveland, was recently installed in the McKinley Memorial Building at Niles, Ohio, where are bronze representations of other leaders of finance and industry. The Otis replica bears this inscription:

Charles A. Otis. Born in Bloomfield, Ohio, June 30, 1827. Pioneer in iron and steel industries in Cleveland and founder of Otis Steel Co. Mayor of Cleveland, 1872. Associated with many developments in city of Cleveland. Died June 30, 1905.

The National Drawn Steel Co., East Liverpool, Ohio, is erecting an addition, 100 x 150 ft., for a warehouse.

Offer of Brier Hill Steel Co.

The Brier Hill Steel Co., Youngstown, Ohio, has offered employees the privilege of subscribing for 15,000 shares of non-par value common stock at $27 per share, subscription period extending from Dec. 20 to Jan. 31 next. The offer contains bonus and other features for the benefit or protection of subscribers. Payments may be made monthly or semi-monthly. Final payment must be made within three years but cannot be made earlier than one year from date of subscription. Dividends are credited to subscriptions until final payment is made. Five per cent interest is charged on deferred balances.

The number of shares that may be subscribed for is limited according to earning power, as follows: up to $1,500 a year, five shares; from $2,000.01 to $3,000, ten shares; $3,000.01 to $4,200, 20 shares, and so on to a maximum of 45 shares for employees earning annually $9,000.01 or over. The bonus plan provides for an aggregate payment of $10 a share within a five-year term. The first payment amounts to $1 a share at the end of the first year from date of subscription, increasing thereafter 50 cents a year until the final payment at the end of five years becomes $3. The payments are made, however, only to workers who have remained continuously in the employ of the company in that time and who have "shown a proper interest in its welfare."

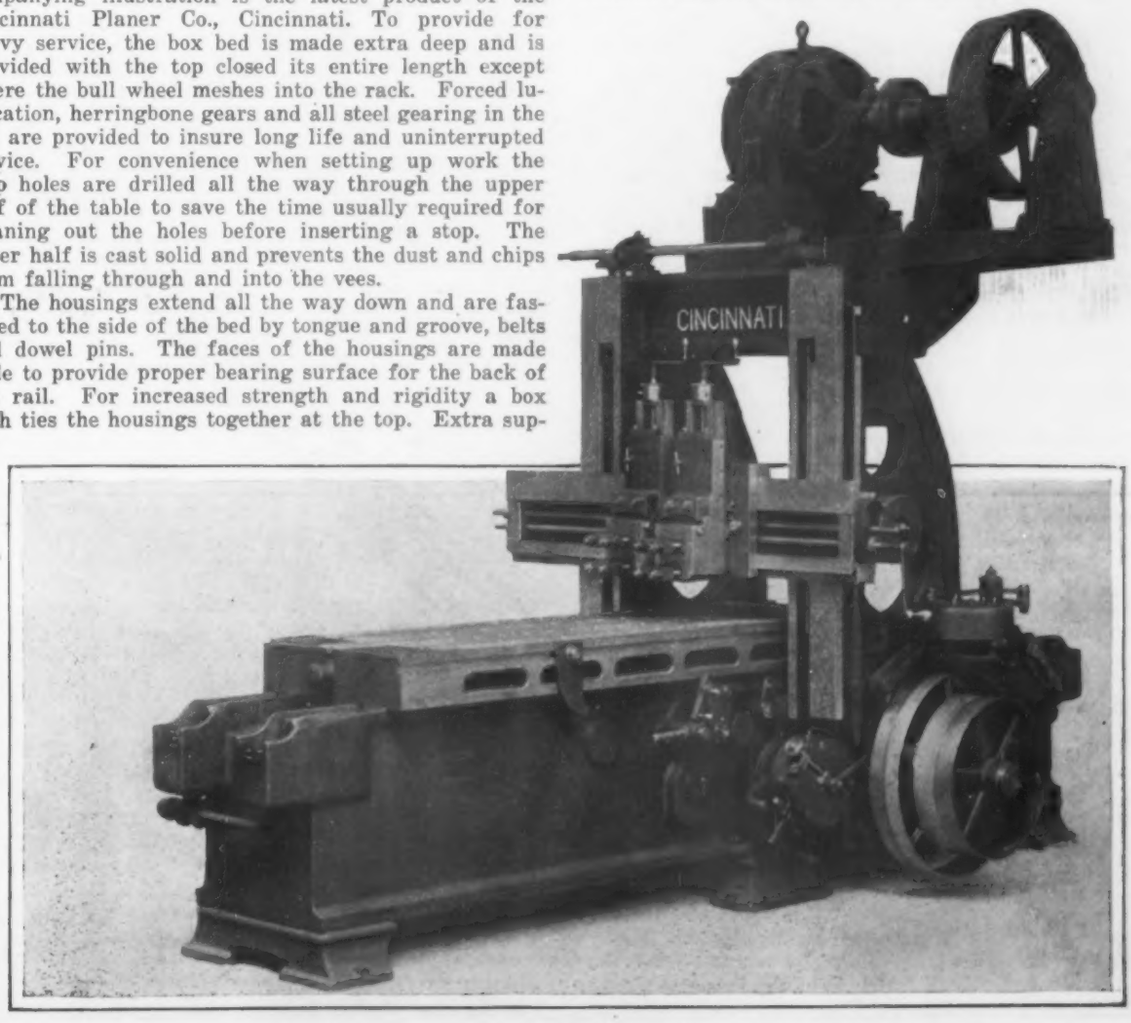
No payment will be required on stock during periods of mill suspension involving unemployment of a subscribing employee. If an employee dies or is permanently disabled before subscription is fully paid, a certificate will be issued him or his heirs with cancellation of any unpaid balance.

30-in. Shoe and Wedge Planer

The 30-in. shoe and wedge planer shown in the accompanying illustration is the latest product of the Cincinnati Planer Co., Cincinnati. To provide for heavy service, the box bed is made extra deep and is provided with the top closed its entire length except where the bull wheel meshes into the rack. Forced lubrication, herringbone gears and all steel gearing in the bed are provided to insure long life and uninterrupted service. For convenience when setting up work the stop holes are drilled all the way through the upper half of the table to save the time usually required for cleaning out the holes before inserting a stop. The lower half is cast solid and prevents the dust and chips from falling through and into the vees.

The housings extend all the way down and are fastened to the side of the bed by tongue and groove, belts and dowel pins. The faces of the housings are made wide to provide proper bearing surface for the back of the rail. For increased strength and rigidity a box arch ties the housings together at the top. Extra support at the saddle is obtained by increasing its bearing surface on the rail. Both heads are mounted on one saddle causing them to move crosswise in unison but provision is made for moving them up and down independently by hand and by power.

The widened bearing surfaces and the weight and strength provided are emphasized as offering a rigid control of the cutting tool and a firm, smooth planing action to the table. The machine is regularly equipped with the company's patented "Tu-speed" countershaft but can be conveniently arranged for plain or variable speed motor drive as shown herewith.



Cincinnati 30-In. Shoe and Wedge Planer Designed for Heavy Work

Will Sell Surplus Materials

WASHINGTON, Dec. 28.—The Shipping Board has asked for bids on surplus materials on the Pacific Coast. Bids will be opened on Jan. 14 at the office of the chairman of the board.

The bids will be on a percentage of appraisal of materials. The announcement states that "for the purpose of bidding such appraisal value shall be assumed at $6,000,000." It has been stated that surplus materials on the Pacific Coast were worth $15,000,000 or more. The contracts proposed by the board would be for a period of 12 months and would provide for the handling of all materials to be certified to the Supply and Sales Division during the period of the contract from cancellation or from the Construction Department and will not include surplus turned over to this division from the Division of Operations.

Heat treating topics are discussed in the "Melting Pot" published monthly by the Chicago Flexible Shaft Co., 5601 Roosevelt Road, Chicago. Two recent issues included articles on the heat treatment of high speed steel, talks on carburizing, development and use of pyrometers, carborundum refractories, insulation of industrial furnaces and hints on annealing.

STEEL COMPANY REPORTS

Federal Trade Commission Tells of Controversy Which Was Carried to Court

WASHINGTON, Dec. 28.—The work of the Federal Trade Commission bearing on the iron and steel industry in the fiscal year ended July 1 is summarized in its annual report.

Commenting on the attempt to obtain monthly cost reports from the iron and steel manufacturers and coke producers, which was halted by injunction proceedings, the commission says:

"Beginning with January, 1920, the commission required monthly reports from the iron and steel manufacturers and from coke producers. The monthly report forms, both for iron and steel and for coke, required information chiefly regarding production costs as shown by their own cost sheets, sales, contract prices, capacity of plants, and orders booked, while an income statement was required quarterly and a balance sheet annually.

"The commodities for which costs were received and tabulated included coke, pig iron, ingots, blooms, slabs, billets, sheet bars, structural shapes, plates, rails, merchant bars, tin plate, and wire rods.

"Approximately 60 per cent of the iron and steel companies made such reports to the commission, including the subsidiary companies of the United States Steel Corporation. A considerable number of the larger 'independent' companies refrained from filing them.

"As a result of failure to file reports with the commission, suits were brought against the Bethlehem Steel Co., on June 4 and against the Republic Iron & Steel Co. on June 7 in two different courts, asking for the issue of writs of mandamus to compel these companies to file the said reports. On June 12 suit was filed in the Supreme Court of the District of Columbia asking for an injunction to restrain the commission from demanding these reports on the basis of the injunction issued in the Maynard case. This court issued another injunction against the commission in behalf of 22 companies.

"These legal controversies tended, of course, to still further reduce the number of companies making reports, though the Steel Corporation continued to file them regularly."

Special cost inquiries relative to iron and steel which were made by the commission during the year are described as follows:

"A number of special investigations into the costs of iron and steel products were made at the request of the Railroad Administration and Tariff Commission, the more important of which are mentioned below:

"At the request of the Railroad Administration the costs of producing iron ore mined in the Lake Superior district during the year 1918 were procured by sending a questionnaire to over 100 companies which were summarized and presented in comparative form together with costs for the year 1917, which had been previously procured by the commission.

"The costs for steel tires for locomotives were examined for three companies at the request of the Railroad Administration. Also at the request of the Railroad Administration the costs of making driving springs and coil springs for locomotives for six different companies were examined.

"At the request of the Tariff Commission, statements were prepared showing for certain typical products average costs for representative companies, based on data obtained during the war.

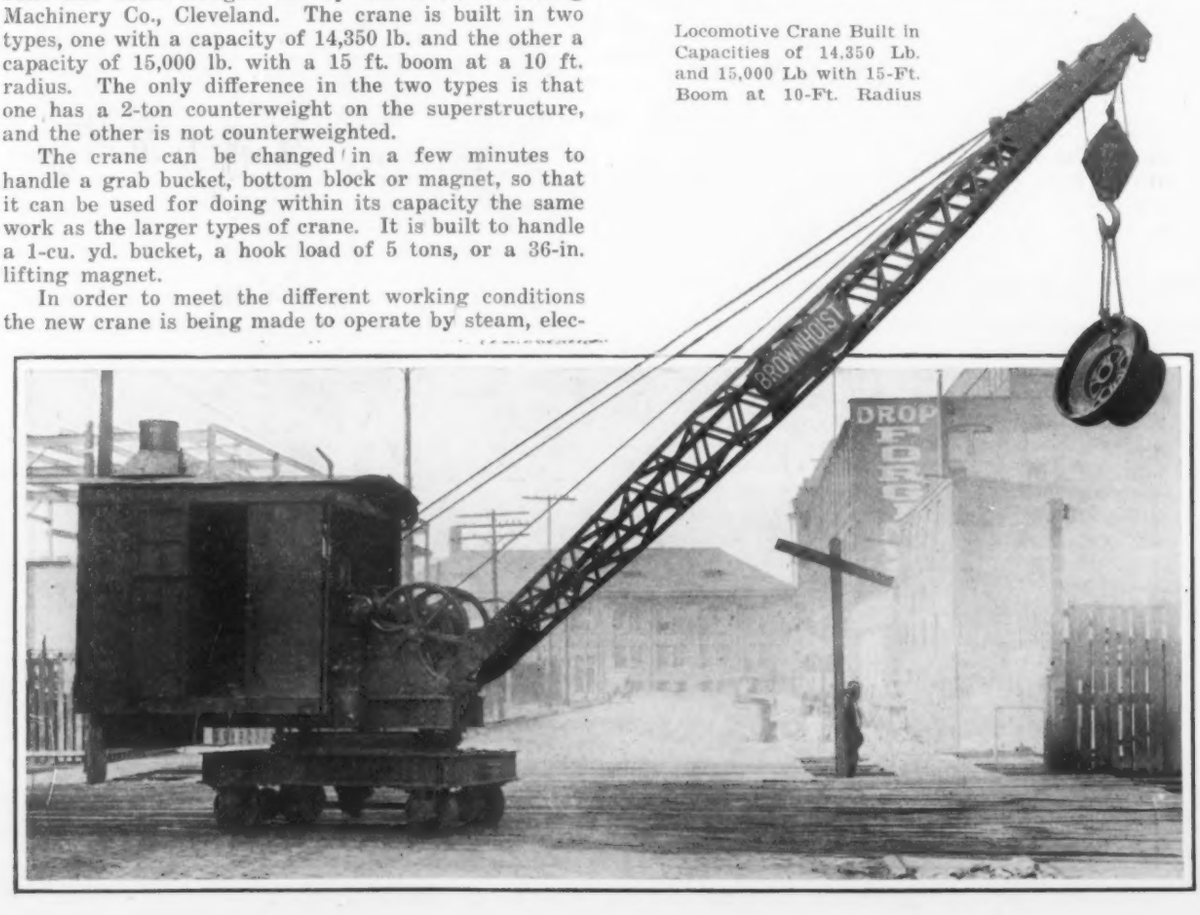
"A considerable amount of work was done in compiling the data on the cost of production of iron and steel products which were collected during the war, but it was found impracticable to complete the contemplated report on this subject during this fiscal year."

Locomotive Crane for Light Loads

A new crane built to meet the demand for a locomotive crane of smaller capacity than it has previously built has been brought out by the Brown Hoisting Machinery Co., Cleveland. The crane is built in two types, one with a capacity of 14,350 lb. and the other a capacity of 15,000 lb. with a 15 ft. boom at a 10 ft. radius. The only difference in the two types is that one has a 2-ton counterweight on the superstructure, and the other is not counterweighted.

The crane can be changed in a few minutes to handle a grab bucket, bottom block or magnet, so that it can be used for doing within its capacity the same work as the larger types of crane. It is built to handle a 1-cu. yd. bucket, a hook load of 5 tons, or a 36-in. lifting magnet.

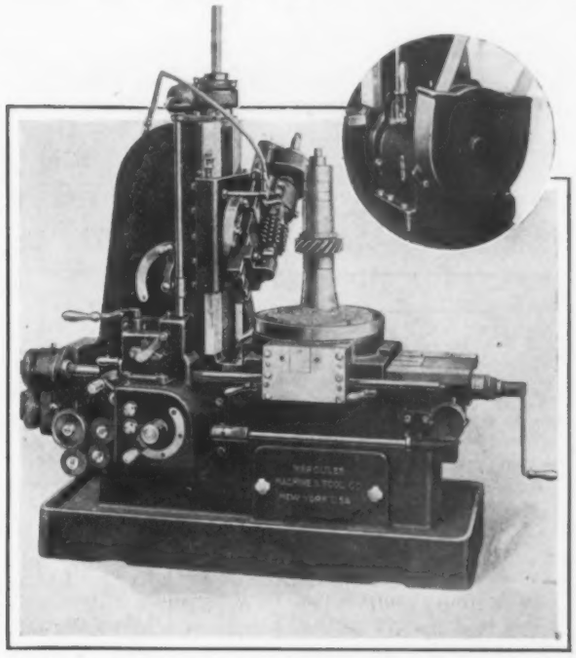
In order to meet the different working conditions the new crane is being made to operate by steam, electricity or a gasoline engine. It will be mounted on either a railroad truck, traction wheels, or creeper truck. The crane will be equipped with booms in all standard lengths, ranging from 15 to 35 ft.



Locomotive Crane Built in Capacities of 14,350 Lb. and 15,000 Lb with 15-Ft. Boom at 10-Ft. Radius

24-in. Gear Hobber

A 24-in. gear hobber for generating spiral, as well as spur and worm gears, has been developed by the Hercules Machine & Tool Co., Astoria, Long Island, N. Y. The set-up of the hobber for generating spiral gears is simplified by a special spiral differential. The feed, spiral and indexing being controlled by independent mechanisms are calculated and set separately and the feed may be changed at any time without affecting the helix angle. The indexing is calculated in the same manner as for plain spur gears of a like number of



Spiral as Well as Spur and Worm Gears Can Be Generated on Hercules 24-In. Gear Hobber. In the insert is shown the gear box for single pulley drive which gives the machine nine speeds

teeth, while the change gears to employ on the spiral attachment are ascertained by a simple formula.

The machine is of box type construction. All gear boxes run continually in oil. The headstock is driven by spiral gears, bringing the head close to the main column, thus to provide strength, smooth-running and elimination of chatter. All clutches are of jawed type. Rapid traverse of the headstock increases the output of the machine, while the cutting lubricant system, built into the machine, is designed to furnish lubricant sufficient to keep the hob cool at all times. An arbor support with a hand wheel for raising and lowering the headstock forms part of the equipment.

The general specifications of the machine are as follows: Capacity for generating steel gears, 4 d.p.; outside diameter of largest gear, 28 in.; width of largest gear, 12 in.; speed of drive pulley, 360 r.p.m., and floor space, 36 x 60 in.

The Foreign Credit Interchange Bureau of the National Association of Credit Men, 41 Park Row, New York, now has more than 300 members and has set a mark of 1000 by June 1, 1921. The bureau, which has been operating for about 15 months, provides its subscribers with a standardized exchange of credit information and in addition it supplies in some cases statements as to capital, volume of business and other credit knowledge. A "Weekly Confidential Bulletin" dealing with conditions in foreign countries is distributed to members.

Transit Construction Commissioner John H. Delaney, New York, has issued authority for the purchase of 100 steel passenger cars for use on the lines of the Brooklyn Rapid Transit Co., 85 Clinton Street, Brooklyn, at a cost of $36.410 each, an advance of $9,012 over the unit price paid on a recent order of like quantity, and an increase of $15,606 over the lowest price paid for steel car equipment for the company's lines.

Vessels Sold by Shipping Board

WASHINGTON, Dec. 28.—Ships of various kinds sold by the Shipping Board up to Dec. 4 totaled 430. These ships were of 2,157,124 deadweight tons and had a sales value of $297,818,393.19. Vessels remaining in the hands of the Shipping Board total 1,686 of 10,821,899 deadweight tons.

Vessels sold included 145 new steel ships, of which 136 were cargo carriers. The Board disposed of 35 ex-German ships, of which 23 were cargo carriers and five were passenger ships. The board sold 10 new wooden ships, 41 barges, two concrete ships and 45 wooden and 28 steel tugs.

The war construction program of the board contemplated the building of 3,268 ships. When the armistice was signed, this program was reduced to about 2,300 ships.

The present fleet of the board is made up of 1,328 new steel vessels, 32 former German and Austrian ships, 282 wood and composite vessels, eight concrete ships and 28 purchased steel ships.

Tapping Attachments for Drill Press

Automatic attachments for tapping and countersinking for use on a drill press have been designed by F. E. Bessler, Bessler Movable Stairway Co., 1900 East Market Street, Akron, Ohio. The attachments are placed on the cross shaft of the drill press and on the up and down drive shaft. Tapping and reversing is automatic, thus doing away with all levers and allowing the operator free use of both hands to handle the work. The drill press can be readily changed to a tapping machine by tightening three bolts with a socket wrench.

Drill Press Equipped with Automatic Attachments for Tapping and Countersinking

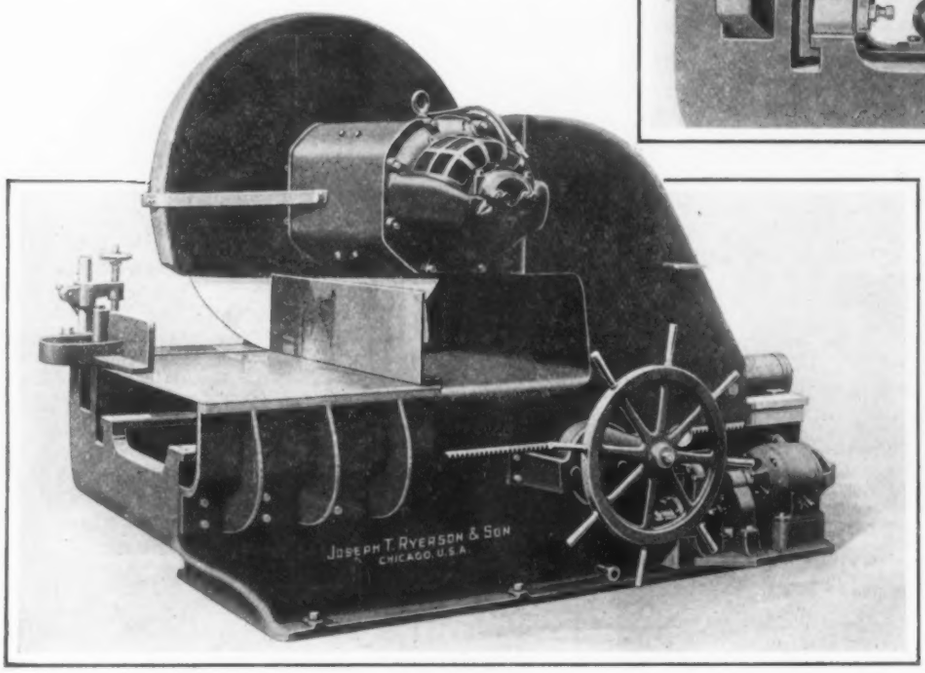
A feature emphasized is that the tap will work to the correct depth thus permitting a hole to be tapped out as tight or as loose as is desired. The capacity of the machine for tapping at the slowest speed is stated to be 225 holes per hr. The depth of the tap can be adjusted by raising or lowering the drill press table and the height the tap will rise from the table can also be adjusted. Any size of tap, it is stated, can be used.

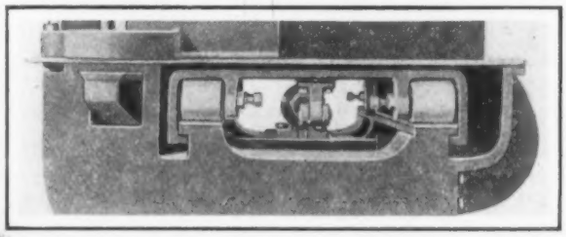
The second locomotive built in the Battle Creek, Mich., car shops of the Grand Trunk Railroad has been completed. It is of the new Pacific type and will be used on passenger trains between Port Huron and Chicago.

High Speed Friction Saws

High speed friction saws designed for the rapid cutting of structural steel are a recent development of Joseph T. Ryerson & Son, Sixteenth and Rockwell streets, Chicago. Varying sizes and shapes of material can be cut in immediate succession without any adjustment of the machine. This and the elimination of the need of clamping the material make for a saving of time. Absence of belts, flywheels, etc., it is pointed out, result in low power consumption and an additional economy is had as the machine is operated by one man. Miter cutting as well as straight cutting is readily handled, a special graduated swivel clamp being furnished as part of each machine.

The machine consists of a heavy cast-iron box base, on top of which is mounted a horizontal rolling carriage. The carriage operates horizontally on rollers provided with roller bearings mounted on eccentric pins for adjustment. The hood is sheet metal and is bolted to the carriage. One side of this hood is hinged so that it may be opened for examining or removing the blade.





Structural Steel of Various Sizes and Shapes Can Be Cut in Immediate Succession Without Any Adjustment of the Machine and Without Clamping the Material, on New Ryerson Friction Saw. The carriage operates horizontally on rollers provided with roller bearings mounted on eccentric pins for adjustment

The blade is soft steel, balanced, hollow ground and nicked on the edge to increase the friction, and is held in place by two cast steel collars. The blade is cooled by jets of water under pressure directed against the cutting edge.

The saw is furnished with a heavy duty motor inclosed on the saw end and semi-inclosed on the outer end by cast grids and wire mesh. The shaft has an adjusting device to minimize the endwise movement or float in the armature or rotor.

In operation, the saw blade, which is mounted direct on the armature shaft of the motor, is fed forward through the work by the hand wheel mounted on the side of the machine or by the electro-hydraulic feed. As a general rule, on the Nos. 1 and 2 saws the hand feed is satisfactory, but power feed can be furnished. The power feed as applied to the machine is a complete unit consisting of hydraulic cylinder and piston, and motor driven pump. This feed is operated by a four-way valve which controls the speed and direction of the saw carriage.

The machines can be furnished for any current or voltage, and are equipped with either hand wheel or electro-hydraulic feed. They are built in four sizes, similar in design and differing only in capacity. Two sizes are for shops handling lighter structural work and two sizes for heavy structural work and railroad shops. Motor and starting device complete, two blades, nicking chisel, mitering clamp, wrenches, etc., are furnished with each machine.

Large Motors and Turbines Built By Westinghouse Company

Engineering accomplishments of the Westinghouse Electric & Mfg. Co. for 1920 are outlined in a review by H. W. Cope, assistant director of engineering of the Westinghouse company. Notable achievements discussed included: A 60,000-kw. 60-cycle triple-element turbine generating unit, the second of this size to be placed in operation, installed at the Colfax station of the Cheswick Power Co.; a 32,500 kv.a. 25-cycle 150 r.p.m. vertical water-wheel generator placed in operation at Niagara Falls; a 23,600 kv.a., 60-cycle, 12,000-132,000-volt, single-phase, oil-insulated, water-cooled transformer installed at the Colfax plant; seven 16,667 kv.a. single-phase, 60-cycle, 12,000-220,000-volt, oil-insulated water-cooled transformers for the Pacific Gas & Electric Co., now being constructed; an installation for the Philadelphia Electric Co. of two 1750 induction-type regulators installed on the low tension side of the transformers supplying two 66,000 volt tie-lines; the installation of 3000-volt direct current locomotives and substations on the Chicago, Milwaukee & St. Paul Railway; electrical equipment completed for the battleships Tennessee, Washington and Idaho and electrical equipment now building for four new 60,000-hp. battleships and two 180,000-hp. battle-cruisers; a 5000-hp. reversing motor to drive a 27 x 40-in. universal plate mill for the Dominion Foundries & Steel Co., Canada; a 5500-hp. reversing motor to drive a 28-in. reversing blooming mill for the Atlantic Steel Co., Atlanta, Ga.; equipment to operate a 72-in. reversing copper mill now building for the West Virginia Metal Products Co.; equipment driving a 16-in. universal plate mill installed at the Bethlehem Steel Co.'s plant, and reversing equipment of a 30-in. two-high bar mill now being installed at the plant of the Follansbee Brothers Co., 35-ton mine locomotives supplied the Cambria Steel Co., and five 27-ton quencher locomotives, equipped with automatic and manual electro-pneumatic control, to be used in by-products coke oven works of the Cambria Steel Co.; 1700-hp. 25-cycle motor driving a turbine type blower supplied to the Inspiration Consolidated Copper Co., and a special motor developed for the Mitchel vibrating screen.

The Canadian plant of the Maxwell-Chalmers Co., which is in Walkerville, Ont., will resume operations Jan. 1. This plant employs 150 men.

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THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

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Significant Holiday Greetings

At this time of the year when holiday greetings are being exchanged, it is highly pleasing to note the evidence that business is not as sordid as those who have been depressed by some developments of the past year are inclined to believe. Among the large number of cards which have come to THE IRON AGE from its readers, we find such an exalted sentiment as this from a New York firm:

> At this season of the renaissance of mankind's finest hope, it is our wish that the pleasure of worthy accomplishment may be yours, and that, looking from the New Year into the coming cycle of the months, you may be gifted with the courage, the enthusiasm and the power to build better than you have ever builded before.

The president of a Cleveland company thus expresses his high ideas of what success is:

> The greatest joy, peace and contentment come through serving others, and to be able to look backward and know that one has been instrumental in making the pathway easier for those who are traveling with and after us is success.
>
> Nineteen Twenty One promises many opportunities to serve our fellow men,—and the success of the New Year will be the result of the combined efforts of those who serve.

The cynic may express doubt and such sentiments may be called visionary, but we believe that they are expressed by men of real vision and that never before was there in business such earnest striving for better ways.

THE IRON AGE certainly feels that the many hearty expressions of good will have brought it nearer to its friends and will make it more anxious to be of service to them.

Data regarding the British ferromanganese industry, usually hard to get but recently made public, reveal some interesting tendencies. They cover the years 1913 to 1919 inclusive. Since 1913 the production has gradually declined until last year it was only 59.2 per cent of what it was in 1913, or about 192,000 gross tons compared with 324,000 tons. Exports last year were 97,000 tons or 54.8 per cent of what they were in 1913, when Great Britain furnished 50 per cent of the ferromanganese consumed in the United States. In 1913 the exports were 55.2 per cent of the output while in 1919 they were 51.3 per cent. The quantity available for domestic consumption in 1919 was 80,000 tons less than in 1913 while the total British steel output that year was heavier than in 1913. Still more striking is the increase in values. The average value per ton of exports in 1919 was £25 16s. as compared with £9 2s. 6d. in 1913. The manganese ore also cost more, having been £8 0s. 3d. per ton of imported ore last year against £2 3s. 1d. per ton in 1913. Despite the recession in this British industry, it is still a vital factor in the trend of the American ferromanganese market.

Rail Requirements

The layman is puzzled by the widely divergent statements made from time to time as to the tonnage of rails the railroads require. Recently, for instance, a presentation was made indicating that the railroads are "short" 12,000,000 tons of rails, and as the average production in the past ten years, minus exports and allowance for rails used in the industries and by electric lines, has been only about 2,000,000 tons a year, the natural conclusion is that if the railroads do need ten to twelve million tons, the case is simply hopeless, as they could not afford to pay for the rails and make the other expenditures that would go with the purchase of the rails.

On the other hand, about a year ago the Railroad Administration published a comparison which suggested that very little arrearage accumulated during the period of Government control. This statement showed that the renewals in the seven years to Jan. 1, 1918, averaged 1,377,569 tons a year and in the three-year test period 1,328,316 tons, while there was laid in 1918 1,111,638 tons and in 1919 about 1,350,000 tons.

The comparisons usually made have some loose ends. In some comparisons, renewals and the laying of new track are lumped together, whereas these items of consumption represent altogether different activities. It is one thing for the railroads to need rails for renewal, and a totally different thing for them to need new track or entirely new line. With other comparisons the loose end is that allowance is not made for the increase in traffic, whereby rails may be expected to wear out faster than formerly.

While there are no complete data for long periods of time as to replacement requirements, there is a continuous record for many years for the Pennsylvania Railroad system. That there is a relation worth considering between rail wear and ton-mileage is forcibly suggested by the Penn-

sylvania's statistics. Taking the past 15 years and dividing the time into five-year periods, the total freight ton-mileage divided by the number of tons of new rails used for renewals gives the following factors:

1905-9	268,000
1910-5	261,140
1914-9	328,470

Thus for two five-year periods there is almost precise harmony. In the last five-year period, moreover, 1915 showed 240,000 and 1916 267,600, continuing the established factor. Then the renewals fell down, 1917 showing 332,300, 1918 475,800 and 1919 417,100.

The Pennsylvania system's ton-mileage has for many years preserved a practically fixed relation to the total ton-mileage of the steam roads, this relation being one-eighth. The normal ton-mileage of the steam roads may be taken as having risen to 400 billion, and dividing by 265,000, the factor indicated by the above comparison, the indication is that the normal replacement requirements are about 1,500,000 tons.

As to replacements not having been up to requirements of late, the Pennsylvania's replacements in the five years from 1915 to 1919 inclusive totaled 691,461 tons, while the ton-mileage in the five years was 227,117 million. According to the factor shown by previous experience, 265,000, the replacements should have been 857,000 tons or 171,000 tons a year, the actual replacements falling short by 166,000 tons in the five years. There was a further recession in 1920, so that either the Pennsylvania is about a year behind or the system renewed rails more freely from 1905 to 1914 than is requisite now.

No hard and fast rule can be laid down from the data given above, but the method of reaching a conclusion seems more logical than some methods that have been employed. The figures suggest that normal replacement requirements now involve about 1,500,000 tons a year, with perhaps 1,500,000 tons arrearage to be made up. The Pennsylvania has just ordered 200,000 tons of rails and as the system represents one-eighth of the entire steam railroad traffic the total orders, in proportion, would be 1,600,000 tons. The replacement orders, including supplementary orders placed later, may total as much as 2,000,000 tons. With rails for new track, industrial use, electric lines and exports the total rail production in 1921 may be guessed at about 3,000,000 tons. The record rail output was 4,000,000 tons, in 1906, that being 23 per cent of the total finished rolled steel output of the year. Meanwhile the total tonnage of the steel industry has greatly increased, so that rails comprise a much smaller proportion of the total steel than in 1906, when an exceptionally large mileage of new track, including interurban electric lines, was laid.

How the recession in the automobile trade has affected wages and employment is indicated in the Government employment statistics reviewed elsewhere. Against an average weekly wage of over $37 in October, the average for November appears to have been about $29. The decrease in employment was 11.2 per cent from the number engaged in October, 33 per cent from the total in July. In iron and steel plants, November showed a decrease of 3.2 per cent from the number employed in October, and the wages were generally 1.5 per cent below the average paid per individual in October. The average semi-monthly wage appears to have been $79.50 in November, or $1 below the average rate in October. In car building and repair plants there was actually an increase of 1.5 per cent in the number employed, but a reduction in the average semi-monthly pay from $75 in October to $72.50 in November.

Old Copper and the Copper Market

A movement, the extent of which is little appreciated but the influence of which is marked, is the surprising importation of old copper, largely from Europe. Coming at a time of falling demand and declining prices, these offerings have had a pronounced effect in depressing the American copper market.

Old brass, or brass for re-manufacture, is an important raw material. By suitable additions of zinc it can be re-made into new brass. In the first 10 months of this year these imports into the United States were over three times what they were in 1919 and nearly five times those in 1913, or 3,486,470 lb. per month, as contrasted with 1,087,226 lb. and 727,178 lb. for 1919 and 1913, respectively.

Imports of scrap copper, classified as "old and clippings," have been nearly three times heavier this year than in 1919 and over 50 per cent larger than before the war while receipts of "composition metal," the chief value of which is the copper content, have expanded phenomenally over last year and 1913.

The battlefields and war industries of Europe are giving up their old materials for conversion into money. The surprise lies in the fact that, despite an actual dearth of copper in some sections of Europe, more of these materials are coming to the American market than ever before, much of them back to the source. The United States is the copper reservoir of the world and, since the war, the largest exporter of zinc.

There will be some surprise not only at the extent of our foreign trade in automobiles, both commercial and passenger, this year, but at the extent of the buying by Great Britain. In passenger automobiles the exports to Oct. 1 were 100 per cent larger than in 1919, or 12,287 cars per month, against 5590 cars per month in all of 1919. Of the total of 110,226 cars exported in the first nine months the United Kingdom is credited with 18,417 cars, or 16.7 per cent. British India ranks next with 9954 cars. There was a gain of 100 per cent in exports of commercial cars. To Oct. 1 these were 22,110, or 2457 cars per month, against 15,569, or 1297 cars per month, in all of 1919. In 1913 the total was only 1009 cars. Great Britain took 21.3 per cent of those exported in 1920. Despite the objection to the left hand drive, American passenger cars are more numerous in Great Britain than is commonly supposed. The showing as to trucks is a striking demonstration of their

growing place in industry. The important feature is not so much the quantity of steel involved as the increasing use of alloy steels, rolled, forged and cast, which are made more efficient by perfected methods of heat treatment.

Prices After Two Wars

At the time of the armistice, there was some speculation as to whether the course of business for a period of years would follow the experience of the United States after the Civil War. Since then there has been a fall in prices and a rise, while we are now witnessing another decline, so that opportunity is afforded to observe whether there is any parallelism. The movements in pig iron and steel prices in the past two years may be compared with movements after the Civil War in pig iron and in store prices of bar iron, both at Philadelphia, authoritative statistics on both commodities having been gathered by Mr. Swank many years ago. The figures are in the form of monthly averages.

In the recent movement of pig iron, we have a decline to the fourth month after the armistice, a steady market to the eleventh month, a rise to the twenty-first month (last August), and now a decline in the succeeding months. Dating from the end of the Civil War in April, 1865, there was a decline to the second month, an advance to the seventh, a decline to the thirteenth and a subsequent advance to the twentieth.

Almost to the month, therefore, we had our first high point after the war at the same time that the second high point came after the Civil War. There is no similarity at all. We have simply moved half as fast.

In bar iron after the end of the Civil War, there was a decline to the fourth month, an advance to the eighth, a decline to the thirteenth and a second advance to the seventeenth month, while the third low point came in the twenty-eighth month. Here, again, we see there were more rapid fluctuations after the Civil War. If we get to our second low point next March, that will be the twenty-eighth month after the armistice, but after the Civil War the third low point came after that interval.

The striking thing in the comparison is that after the Civil War there were many ups and downs. Numbers of months have little to do with the matter, the main thing being that after a great thing like a war men change their minds rapidly, tending to go from one extreme to the other, and equilibrium cannot be reached except by a succession of swings.

The expectation that there will be a prolonged downward swing in prices is not in keeping with the history of commodity markets. The rapidity of a decline is not an evidence that the decline will last long, but rather that bottom is being sought whereby there can be a rebound. It is only when there has been too much construction, when time must be allowed for the country to grow up to its facilities, that a long time is required for adjustment. When it is merely a case of writing fresh values upon commodities or services, a matter of men making up their minds afresh, the readjustment can be completed in a relatively short time, and that is what we have now. It is a case of remaking a mental condition, not a physical condition.

Radicals and the Open Shop

The Federal Council of Churches is worried about the agitation for the open shop and has issued a statement warning the public against what it calls a movement for the open shop, which words, it says, are frequently used to designate establishments that are definitely anti-union. In view of the close connection of the Federal Council with certain gentlemen of radical tendencies, this latest pronouncement seems almost humorous.

If it is true, as it doubtless is sometimes, that the advocate of the open shop is a non-union man, that fact does not justify the Federal Council in its warning and certainly it would not be qualified to decide as to the sincerity of any movement carried on by manufacturers or other employers. For, if the council should be called upon to decide, the decision might really be made by such a radical as Prof. Harry F. Ward, a prominent member of the secretarial council of the Federal Council of Churches, who, in a meeting recently held in New York, referred to the attempt being made by the Federal Council of Churches to organize an adequate "research staff" and added:

"Society to function properly must recognize that property has no right to exist. Most people in the churches will agree on the immoral character, from the standpoint of the church, of unearned income. * * * We do not know what industrial democracy means, but it means some kind of sharing, or actual control."

The warning which has just been published in the newspapers declares that it is incumbent upon Christian employers to scrutinize carefully any movement, however plausible, which is likely to result in denying to the workers such affiliation as will, in their judgment, best safeguard their interests and promote their welfare. Would it not also be well to scrutinize any movement in which those who declare that property has no right to exist find conditions so congenial?

An Alloy Analogy

Three metals—manganese, chromium and silicon—play peculiarly important and in some respects analogous roles in iron and steel metallurgy. All three, when amounting to 12 to 14 per cent of the resultant metal, give distinctive products. Manganese steel is the oldest and most familiar of these. Its striking properties are well known as well as its usefulness, which has been limited to a relatively narrow field. There are signs, however, that we are to hear of wider uses in different forms. Chrome steel, containing 12 to 14 per cent chromium, a discovery of very recent years, possesses almost unexcelled properties as a stainless and non-corrosive metal. The war broadened its field of usefulness and progress in heat treatment is likely to extend its value. Silicon in cast iron up to 12 per cent has supplied several grades of unusually effective castings which possess under different names properties which have made

The Iron Age and Its Readers

One of the past week's letters to THE IRON AGE was from a reader in Indiana who had sent us the amount of an annual subscription. When informed that his present subscription would not expire for some months, he wrote, "You can extend it for a couple of years, as I guess I will live to read it as I have since 1876."

Another of the letters was from Rio de Janeiro, giving us the assuring statement that "even our Brazilian salesmen watch with interest for any news which you may bring us. Naturally we especially appreciate general information regarding the iron and steel situation, but more particularly with reference to export trade from U. S. A."

for them an important place in the chemical industry.

The analogy is not confined to a 12 per cent content but finds a parallel in certain steels containing around 2 per cent of the same elements. Chromium steel containing 2 per cent chromium made it possible during the war to produce a permanent magnet steel which, owing to the lack of tungsten, was becoming a scarcity. For other more extended commercial purposes a 2 per cent chromium steel has a wide use. Steel containing 2 to 4 per cent of silicon has a wide application in the electrical industry due to the demand for a material of high magnetic permeability and yet low hysteresis losses. During the war a 2 per cent manganese steel was developed which as cast steel anchor chain made it easier to supply the wants of our merchant marine. This steel, too, is capable of assuming striking properties under certain conditions of heat treatment. The nickel steels also belong in this latter class, but as yet no 12 per cent variety of this has been developed.

The possibilities are many that other metals, such as cobalt, which belongs to the same chemical group as manganese and nickel, will play a role similar to manganese, chromium and silicon in one or both of these distinctive classes. The realm of alloy steels is certainly one of great interest to the investigator and prolific of combinations of high commercial values. The engineering world has come to expect new developments at rather frequent intervals and not merely those of indefinite application in the arts.

The plant of the Vanadium Corporation, 120 Broadway, New York, at Bridgeville, Pa., is now running full on Peruvian ores, and such production will be continued for an indefinite period. The company has closed its Colorado properties at Vanadium, Fall Creek and Placerville, and will use its Mina Ragra mines in Peru as the source of raw material supply. The Colorado mines will be used for reserve supply only.

Landers, Frary & Clark, New Britain, Conn., manufacturer of electrical specialties and general metal products, have arranged for operations at their plant on an 8-hr. day basis. The change has been made in a number of departments and will become effective in all departments beginning with the new year. A. G. Kimball is president.

Jenkins Brothers, Bridgeport, Conn., valves, gave its 750 employees a Christmas bonus of $100,000, which represents approximately 10 per cent of the earnings of the men during the past year. The total amount given its employees ran close to $250,000.

CORRESPONDENCE

Three Shifts in Continuous Processes

To the Editor: In its extensive synopsis of the address of Horace B. Drury at the Engineering Societies Building in New York on Dec. 3, THE IRON AGE presented to its readers the first comprehensive statement of the first comprehensive study of the experience of American steel plants with three shifts in continuous processes. In view of a charge which was made from the floor of the meeting that the investigation was "paid propaganda," we ask you to print an explicit statement as to the auspices under which the research was carried on.

On the initiative of the late Charles M. Cabot of Boston, at a stockholders' meeting of the United States Steel Corporation in 1911, Judge Gary appointed a stockholders' committee on labor conditions. Stuyvesant Fish was chairman; the members were steel men, financiers and railroad men of standing; William H. Matthews was secretary. A year later the committee brought in its report, reviewing the advances made in accident prevention, workmen's compensation and the shorter working week; and recommending that the 12-hr. day be eliminated from steel practice as "decreasing efficiency" and "lessening the vigor and virility" of the men so employed, and that steps be taken to "reduce the long hours of labor."

On his death, Mr. Cabot left a trust fund, the income of which became available in 1919. The managers of the Cabot Trust are Philip Cabot, chairman; Paul U. Kellogg and Edward T. Devine. The first appropriations made under the Cabot trust were in line with Mr. Cabot's old interest. The resulting plans were made known through appropriate channels.

According to the terms of the bequest the fund was

for such charitable uses for the public benefit as are allowed and can be sustained by law of the general character and for the general objects hereinafter described. Without intending to limit the discretion of said board by a definition I suggest as illustrating such general character and objects that said fund be used to procure or encourage or promote the investigation and study of industrial conditions in this country and in the publication of the results of such investigation and study to the end that industrial abuses and hardships of industrial laborers may be known and remedied.

An appropriation was placed in the hands of Morris L. Cooke, consulting engineer of Philadelphia, to study the three-shift system so far as in force in American steel plants. Mr. Drury worked under Mr. Cooke's direction. The plan and conduct of the investigation were left to Mr. Cooke's professional judgment without conditions or interference. There was entire agreement between him and the managers of the trust that this being an engineer's study of an engineering problem, the findings should first be brought out in regular course before recognized engineering bodies. This was done at the joint meeting of the Taylor Society, the New York Section of the American Institute of Electrical Engineers and the management and metropolitan sections of the American Society of Mechanical Engineers. Your extensive synopsis of this report will enable the iron and steel trade generally to estimate the study at its true professional value.

HENRY COPLEY GREENE,
Secretary Board of Managers
Charles M. Cabot Trust.
142 Berkeley Street, Boston, Mass.

The By-Products Coke Corporation, 332 South Michigan Avenue, Chicago, is enlarging its plant at One Hundred and Twelfth Street and Torrence Avenue. Three one-story transfer houses, 28 x 33 ft., 30 x 33 ft., and 17 x 38 ft., and two coke screening stations, 37 x 74 ft. and 38 x 106 ft., to cost $560,000, are being constructed by the Semet-Solvay Co., Syracuse, N. Y.

Contour Buffing Machines

The surface dressing machines shown in the accompanying illustrations are manufactured by the Contour Buffing Machine Co., 410 Bird Avenue, Buffalo, N. Y. They are adapted to automatically feed to any standard polishing or buffing lathe, articles of oval, rectangular, triangular or other contours as well as articles of circular form. Drive is by an electric motor attached to the bed plate which rests on slide rails permitting an adjustable travel of 8 in. to or from the polishing wheel or buff, to suit work of different diameters and different sizes of polishing wheels or buffs.

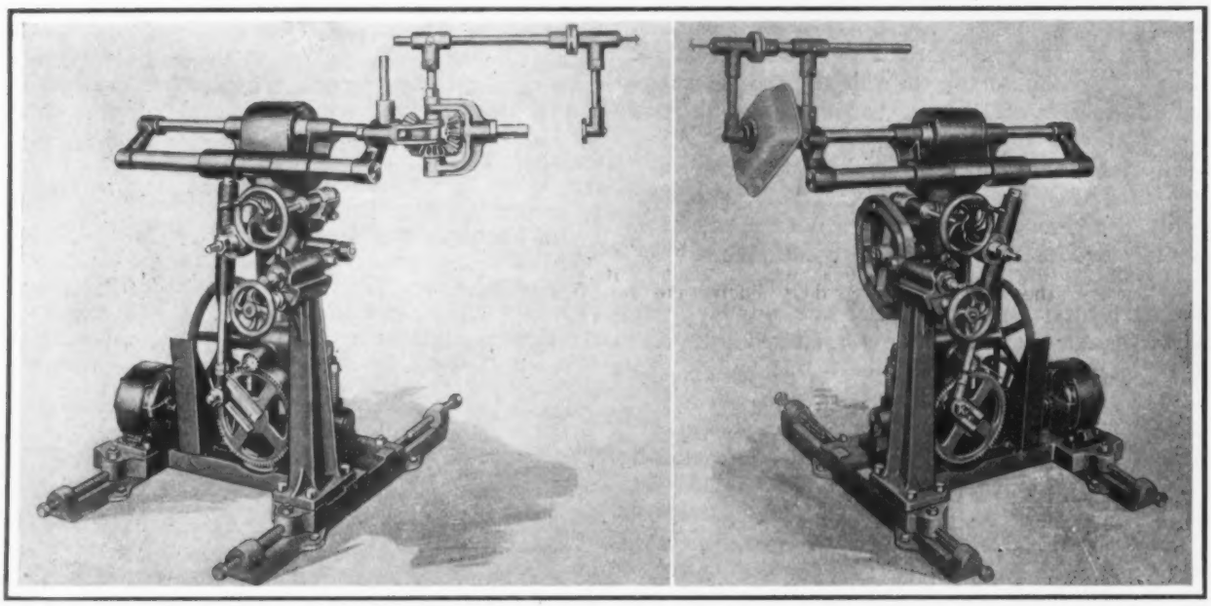
The work spindle has a slow rotating motion, and is supported in a sliding frame which has a reciprocating motion, of 16 in. maximum, adjustable to zero. The spindle and frame are driven by gears on a vertical shaft working in the vertical column. The column is supported on trunnions at the bed-plate and is free to oscillate through about 10 degrees. When the article being polished or buffed is of special contour this oscillating movement is controlled by a cam adapted to the contour of the article. The guiding roller for the cam is adjustable in position by the lower handwheel and slide and is controlled by an adjustable spring in the slide. When the article is of circular form, the cam is not required, a link being substituted.

The upper part of the column and the sliding frame swivel by means of the worm gear and hand wheel, so that the operator may swing the article to or from the buff wheel without stopping the machine. The article is held on the chuck by the work holder as shown in the illustration of the right hand machine. The outer arm, which holds a free running washer of wood against the work, is pulled hard to the right by a long adjustable tension spring inside of the adjustable pipe at the top. This outer arm is held by stops in the position shown and can be swung through a half circle when it again engages the stops and is held in that position while the article is being removed from the chuck and another put on.

A variable angle attachment, shown in the illustration of the left hand machine, can be readily attached to the outer head of the sliding frame for polishing conical articles and bottoms of pans. The gears in this attachment transmit motion from the work spindle to the short spindle journaled in the yoke bracket and extended to receive the chuck, and the yoke bracket can be swiveled through an angle of 90 dg. When this variable angle attachment is in use, the work holder attachment is transferred to the fulcrum pin of the yoke bracket.

The motors are reversible in direction of rotation and the article being polished or buffed is always rotated towards the polishing wheel or buff. The machines are made right hand and left hand, as two machines are run in conjunction with one polishing or buffing lathe by one man and a saving of labor thereby effected.

Various modifications of these machines can be furnished to suit requirements. If the articles to be polished are all of circular form, the cam mechanism can be dispensed with and for many classes of work the mechanically operated reciprocating motion is not necessary, as the sliding frame can be moved by hand to any desired position and locked there.



Left-Hand and Right-Hand Contour Buffing Machines. They are designed to feed automatically to the buff wheel articles of circular, oval, rectangular, triangular or other contours

Photograph Album for Selling Machines

The E. W. Bliss Co., Brooklyn, N. Y., has compiled a large volume of photographic reproductions of Bliss presses under working conditions in many shops. They are bound in loose-leaf style, each picture being photoprinted on heavily coated stock. There are several hundred pictures, classified according to the character of work which the machines perform. Each subdivision is indicated by lettered index tabs so that the consultant can turn readily to the particular type of machine in which he is interested.

Actual operations are shown in the photographs, as for example a No. 18 inclinable press closing-in sleigh bells at the rate of 20,000 per 10 hr., using a single die. The material used in this operation is cold-rolled steel, .020 in. thick. The book has been distributed among the company's representatives and is not intended for general distribution, but the foregoing brief description has a suggestion value for other manufacturing concerns, for the impressive educational value of the display must meet with a favorable reception on the part of a prospective machine user.

Winthrop G. Hall of the operating committee of Wickwire Spencer Steel Corporation, Worcester, Mass., recently before the Worcester section A. S. M. E. showed a practical illustration of the use of moving pictures in reducing scrap and waste in a wire mill. He said that the method which the company adopted was to show the rank and file in the mill graphically the amounts of money involved in the annual scrap account, call attention to the folly of putting so much expense into material, and then throw it away. By having the men see themselves on the screen, making waste and scrap, they realize the inconsistency of it and this graphic illustration stimulates purpose to put a stop to careless practices, many of which come to be done unconsciously.

Staggered Tooth Keyway Cutter

The Velco Mfg. Co., Greenfield, Mass., announces that it has recently procured patent rights on a staggered tooth cutter bar or broach for the cutting of keyways. The bar resembles two smaller keyway cutters welded together with the teeth of one advanced the distance of one-half the pitch. This staggered relation of the teeth allows the bar to be milled deeper, at the same time giving it strength by forming a large radius at the root of the cutting teeth. It is explained that on account of the increased chip clearance and the pronounced undercut of the teeth, the capacity of the bar is materially increased over that of the standard tooth cutter. It operates equally well in holes from ½ to 10 in. in length. The manufacturers advises that this

Deeper Milling of the Bar and Increased Strength Are Provided by Staggered Teeth on Keyway Cutter

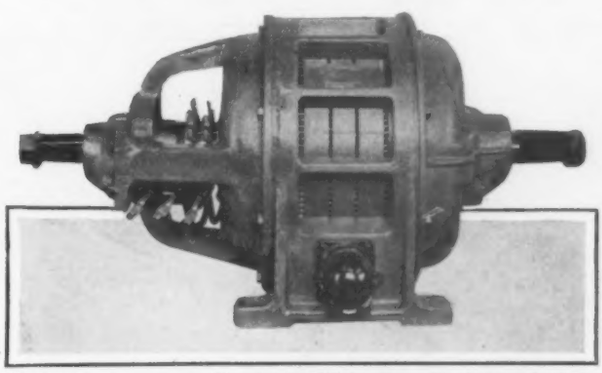
bar is at the present time in actual operation cutting keyways in machinery steel, 10-in. pieces, doing the work in one stroke that previously required the use of two broaches. The keyway cutter is made to use on any broaching machine.

Alternating Current Motor for Cranes and Hoists

A new type of alternating current motor for operation on cranes and hoists has been developed by the General Electric Co., Schenectady, N. Y. The motor is known as the M. T. C., and is designed to take the place of the former M. T. C. and I. T. C. types. It has a number of important improvements over the old design.

The motors are generally smaller in diameter and longer than those of the same horsepower of the old design, which reduces the armature flywheel effect. They also have larger shafts and bearings. At rated frequency and voltage, the maximum stationary torque is twice the running torque. All motors of 40 h.p. and below are rated on a 30 min. 50 deg. C. rise and from 50 h.p. up on a 60 min. 50 deg. C. rise basis.

A resistor has also been designed for work



Reduced Armature Flywheel Effect One Feature of New Crane and Hoist Motor

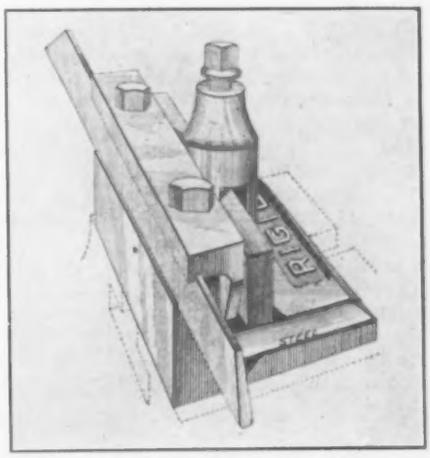
with the new motors. Reduced maintenance and smaller maximum current demand, and protection for the motor from abuse either on the part of the operator or from abnormal working conditions, are features emphasized as furnished by the new resistor.

Employees Choose Representatives

Representatives of workmen have been chosen by employees of the various departments of the Youngstown Sheet & Tube Co. at its East Youngstown and Hubbard, Ohio, plants to act for them in the representation plan which has been in effect for a number of years. Officials state that through this arrangement there has come about a better understanding with the men and more harmonious relations have been created. Many minor disputes which might have led to more serious consequences have been settled in an amicable manner. The recent election of representatives was conducted entirely by the men, facilities being furnished by the company. Only citizens of this country may serve their fellows in the representation system. A number of contests created considerable good-natured rivalry among the contestants for representatives. The committee representing the employees meets at regular intervals with officials of the company, chiefly operating heads, and discusses matters pertaining to working conditions.

Cutting-off Tool of New Design

Increased production is claimed for the cutting-off tool shown in the accompanying line drawing and marketed by the Rigid Tool Holder Co., Washington. Other advantages of the tool as explained by the manufacturer are: It cuts on the back stroke, right hand or



Back Stroke Cutting-Off Tool

left; gets up close to the chuck; is always erect, and cuts straight and free.

Would Develop Water Power

WASHINGTON, Dec. 28.—Applications for permits to develop more than 12,000 hp. have been filed under the Federal water power act, with the Federal Power Commission. One hundred and twenty-nine projects are involved in 27 States, as well as in Alaska and the District of Columbia. They range in magnitude from a 10-hp. plant to serve a colony of summer cottagers in the Wyoming mountains to a 3,000,000-hp. project on the Colorado River in Utah and Arizona. The latter involves the storage of the waters of the Colorado River and its tributaries in a huge reservoir with a resultant fall of 2,650 feet. Thirty-five of the projects are in California for the prospective development of 2,460,600 h.p. Arizona is credited with 6 projects aggregating 3,613,200 hp. The largest development for the Eastern States comprise 13 projects for New York with an aggregate development of 2,813,200 hp.

Syracuse Foundry Purchased

E. C. Stearns & Co., hardware manufacturers, Syracuse, N. Y., have just purchased another foundry known as the old Economy Foundry Plant at Syracuse, on West Belden Avenue and Sand Street. The property has 270 ft. frontage on West Belden Avenue and a depth of 203 ft. on Sand Street and extends to the West Shore tracks. This foundry will be utilized for heavy or floor work, while foundry No. 1, in connection with the plant at Adams and Oneida streets, will be confined almost exclusively to light or snap flask work.

On Jan. 1 industrial companies at Youngstown, Ohio, will distribute over $2,500,000 in dividends for the fourth quarter of 1920, the principal disbursements to be made by the Youngstown Sheet & Tube Co. of $1,375,000 and the Brier Hill Steel Co., of $537,500.

54-In. Tire Turning Lathe

A heavy pattern 54-in. tire turning lathe for car, tender and engine truck wheels, is a recent development of the Putnam Machine Co., of Manning, Maxwell & Moore, Inc., Fitchburg, Mass. The bed is 23¼ ft. long, 6 ft. 6½ in. extreme width, and a pit 28 ft. 10-in. x 9 ft. 8-in. is required. The machine weighs 86,000 lb. The bed is cross-tied, strongly braced and solid on top, preventing chips from lodging and adding materially to the strength and rigidity.

Some time ago the company placed on the market a 42-in. tire turning lathe. An analysis of the two machines discloses improvements and new features in the 54-in. lathe. The 42-in. lathe was for work on standard gage, 4 ft. 8½ in. wheels, whereas the new machine will handle standard gage as well as narrow, and down to 3 ft. 6 in. gage.

Another feature is the tool slide arrangement, which reduces the turning of a pair of tires to two operations, both performed without change of cutting tools. Two tools, a roughing tool 2 x 3 x 20 in. and a forming blade, 6⅝ x 3⅜ x 1¾ in., are rigidly held in the tool slide and may be used independently one of the other, or either removed for grinding without adjusting the other. The forming blade is held by a friction clamp, therefore all wear in changing it from one contour to another is eliminated. The bases of the tool slide, which are 28-in., have hardened and ground steel plates on those surfaces where the longitudinal tool slides bear. A steel casting constitutes the top of the tool block. The blocks are provided with 18-in. hand wheels.

The tailstock is moved along the bed either by an auxiliary 7½ horse-power motor, or by an individual countershaft, the mechanism for this purpose allowing the motor or countershaft to be started under no load, the control being a friction clutch and containing a relief which operates mechanically when the tailstock reaches a position where it is clamped.

When the tailstock is run into operating position, it is automatically clamped to the bed by a compensating clamp. In withdrawing the tailstock, when unloading, it is not necessary to reverse the direction of the motor. The headstock is permanently locked in like manner by the left hand tool block. The parts affected are tied together, it is stated, so that the strains due to the cutting tools are self-contained within those parts; when, therefore, the tailstock is run to and clamped in position, both it and the headstock are firmly locked to their respective tool blocks, and the downward force of the work against the cutting tool and the upward force tending to lift the head from the bed, are neutralized. Tying these parts together, it is explained, practically eliminates chatter and allows the heaviest cuts to be taken with ease and without general vibration.

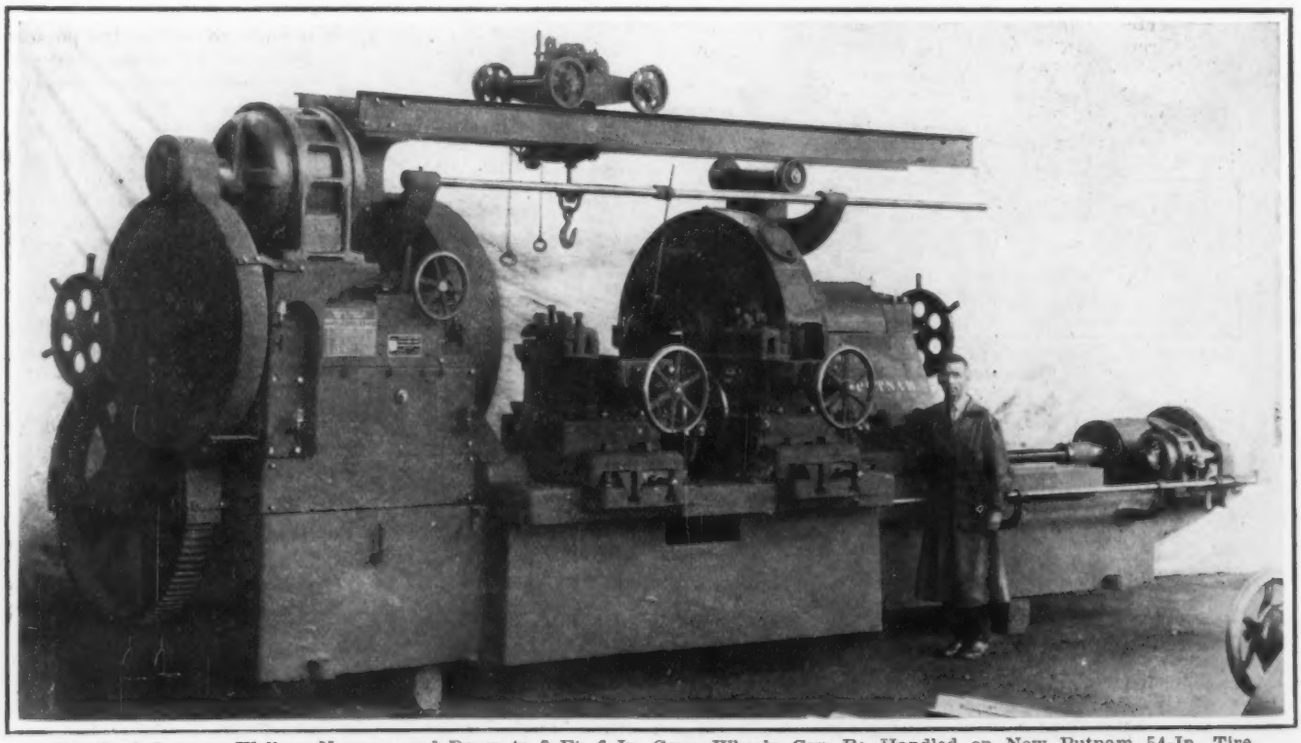
Both the headstock and tailstock main spindles are bushed, provision being made for quick removal of these bushings, thus to maintain accuracy of the entire spindle alignment. The internal spindle in the headstock and the tailstock are controlled by spring pressure which automatically tightens the bushings on the axle, thereby eliminating looseness and facilitating putting in and taking out car wheels without adding an end thrust to the main spindles. The end thrust, due to driving by serrated dogs, is taken by thrust collars located on the external spindles and running in a bath of oil. Spindles and faceplates are made as one piece.

Each faceplate is equipped with four Putnam non-slip driving dogs, automatically adjusting to the wheel when released, and reducing to a minimum the end thrust. The maximum distance between the faceplates is 10 ft. 9⅞ in., while the face of the faceplates, including the face of the ring gears, is 12 in. It is therefore possible to accommodate trailer wheel axles having journals as large as 10 in. in diameter by 16 in. in length, and wheels having a maximum diameter over the thread of 52 in., and those having a minimum diameter of 26 in.

Four interchangeable types of drives, i.e., cone pulley, single pulley, constant and variable speed motor, are furnished, the main headstock being the same for each type of drive. It, therefore, is possible for a lathe furnished with any one of these drives, by the addition or elimination of some of the standard parts, to change to any of the other types of drive, with a relatively small amount of labor.

All gearing is inclosed. The gear changes are made by individual steel beveled jaw clutches and sliding gears, with interlocking mechanism that precludes the possibilities of engaging two conflicting trains of gearing simultaneously. With the exception of the motor pinion and gear, the gearing throughout is of steel. The motor pinion is non-metallic, unaffected by climatic conditions, with an iron gear of fine grain and high tensile strength, thus to give long life and eliminate noise. The faceplate gears are of the herringbone type.

A calipering attachment is furnished, which remains attached to the machine. When specified, the machine can be equipped with a pneumatic crane to facilitate the presentment of work to the faceplates.



Standard Gage as Well as Narrow, and Down to 3 Ft. 6 In. Gage Wheels Can Be Handled on New Putnam 54-In. Tire Turning Lathe

Judge Gary's Views on Business Conditions

Optimistic as to Future of This Country— Says All Who Honestly Toil Can Succeed— Discusses Relations of Capital and Labor

JUDGE ELBERT H. GARY, chairman of the United States Steel Corporation, in the leading article in the business forecast number of Leslie's, discusses business conditions. He says that while he recognizes and for many months has comprehended dangers in the present situation, he is more optimistic in regard to the future of this country than he has been at any time during the last six years.

"If," he says, "people generally will recognize the possible dangers, and will, each for himself or herself, do everything possible and practicable to improve conditions, we shall soon return to a basis of living which should be entirely satisfactory."

Tendency to Lower Basis

The present tendency is toward a lower, more reasonable and fairer basis, and he adds:

"The whole community desires and strives for this. The difficulty is found in the fact that every individual is perfectly willing that all others shall make reductions—the larger the better. As there was, more or less, a scramble for higher and still higher prices when they were advancing, there will be just as much selfishness in the enforced use of brakes when there is a tendency toward decreasing prices. Now a general public, including particularly those who are neither sellers nor buyers to a large extent, will in one way or another bring about a fair and reasonable adjustment of prices. The law of supply and demand will be the principal factor."

United States Is Independent

As to the independent position of the United States, Judge Gary says:

"Ours is the richest of all nations. We have the most gold. We have the largest amount in cash. We are a creditor nation. The annual productive capacity of the United States exceeds in value that of all other countries. We are practically self-contained for the purpose of supplying our necessities. With full and adequate facilities for transportation between the United States and other lands of this continent, we could, with respect to the necessities and comforts of life, be perfectly independent of all other parts of the world. Circumstances beyond our control or influence placed the United States in this position. We do not boast of this. We deplore the awful tragedy that brought destruction and is hindering progress in other nations; but facts, however stern and undesirable, must be considered in the endeavor to sound the economic situation."

Capital and Labor

Referring to the relations between capital and labor, Judge Gary says:

"In the United States capital must not and will not give cause for offense to labor; in the United States labor must not and will not destroy itself by trying to wreck capital. There has been great progress in America with regard to these relationships during recent years.

"Employer and employed are not here spoken of as master and servant; they are associates, and both find the relationship a pleasant one. Each is obligated to consider and protect the rights and interests of those he works with. Interdependence is complete and perfectly admitted. This is not a theory; it is a practice. Capital understands not only the honesty of the situation, but also its wisdom."

Opportunity for Success

Speaking of the opportunities for advancement in this country, Judge Gary says:

"More and more it is being demonstrated in America that by reason of opportunities afforded in our well-fashioned republic and under the protection completely afforded by our laws, wealth and position inevitably are distributed. Families in one decade poor and without influence, in the next loom leaders in prosperity and power, in accordance with their development of initiative and ability. In America the workmen of to-day are the employers of to-morrow. I have been immensely interested in this characteristically American tendency, and have inquired into it. Practically all the successful men in the industry with which I am associated, that of the manufacture of iron and steel, began life without pecuniary advantage, or any influence save that which they themselves created through faithful and honest performance of their duty as it came to hand. This fact is undeniable."

Class Legislation

Judge Gary takes a strong position against class legislation and on this subject says:

"And further I trust that we shall avoid the danger of discriminatory legislation in this country. Any legislation that is calculated to create dissensions, or to affect favorably one class, as it is called in our general terms, to the prejudice of another, is harmful and vicious, and carried to its natural results may endanger even the national structure itself.

Harmony between all classes of people concerning the problems in which all have a direct and personal interest is essential to the best results for all. Antagonisms in thought and intention are liable to create disturbances and generally produce injury and loss."

Unfair Income Tax

Judge Gary does not object to a fair income tax but he is very much opposed to the present law. On this subject he says:

"I regard the income tax law now in force in the United States unreasonable, unfair, and inimical to the best interests of the country, for the reason that it tends to create classes and to discriminate between them. There should be, I think, no objection to an income tax. It is as fair to tax incomes as it is to tax any other property. It is right to compel the possessor of means to pay the expenses of government; but a law which makes a few people pay the total of a large tax, the amount and uses of which may be determined by the remainder of the people who constitute, by comparison, nearly all of the population, and who are themselves entirely exempt from the payment of any part of the fund, is inequitable and dangerous. When the theory of this law is carried to its logical conclusion, who can foretell the result? It is an attempt forcibly to distribute wealth, however honestly acquired; and in its effect it is likely to minimize, perhaps destroy, sooner or later, all ambition to progress, to achieve, to develop, to occupy a place in the ranks of successful individuals or collections of individuals. Discriminatory legislation hereafter might be applied to clergymen, to professors, to lawyers, doctors, teachers, merchants. Such a law is wrong in principle."

No Room for the Demagogue

In conclusion, Judge Gary says:

"If I read aright the signs of the times, we may look forward with confidence to marked improvement in business results, perhaps not so soon or so rapid as we could wish, but as certain and as satisfactory as the disposition and the action of the majority of the people themselves will permit. . . . . Every diligent, honest, and worthy member of the community may prosper if he really wishes. There will be no room for the vicious or for the demagogue."

Iron and Steel Markets

PROSPECTS POOR

Year Closes with Buyers Apathetic

Less Demand from Oil Industry Likely—Prices Down in Nails and Hoops and Bands

In taking account of conditions as the new year comes in, the iron and steel trade sees no prospect of a buying spurt for some weeks. The flood of shipments from mills of accumulated and current output following the release of cars restricted up to that time to coal carrying has placed in large consumers' yards somewhat more material than they were able to dispose of, especially with the curtailment in general demand.

This condition has encouraged the postponement of buying. Until a belief in the fairness and stability of the present prices is established, no return to activity appears likely. The independent makers consider they have done their part by discounting reduced manufacturing costs when they dropped to the Steel Corporation price levels. The wage cuts made and impending are an expected result.

The last week of the year is marked by production at full blast by the Steel Corporation and by total idleness of some independent plants and varying rates for others up to perhaps 55 per cent, or an average of about 25 per cent for the independents and not much over 54 per cent for all the mills. The first week of 1921 will be better in that accumulated orders will call some mills into operation.

Revision of steel contracts to the basis of March, 1919, has not prevented suspensions, and in the case of the Steel Corporation the successive suspensions since August have been released only in a small measure, and it seems clear that the leading producer has now less than six months' orders, particularly in view of its present high percentage of operations.

Outstanding in the contrasts between the leading producer and other makers are remarkable performances by Steel Corporation plants. In recent days 47 of the 59 blast furnaces of the Carnegie Steel Co. have been producing as much as the total of its best 53 furnaces have made at other times. Plants of the American Sheet & Tin Plate Co., operating 96 per cent of its sheet mills, have produced in excess of 100 per cent of rated or theoretical production.

Such reinstatement of suspended orders as has been made appears to be largely in sheets and has been surprisingly small in wire products. Noteworthy is a statement by a leading Detroit automobile company that it will come into the market in January for 1500 tons of sheets per month.

An unexpected development is a reduction in the demand which was expected in 1921 from the oil industry. Some curtailment in output has been decided on; less tank construction is thus likely, and one large oil company which recently took bids on tank plates has now decided not to buy. Lower than mill prices were obtainable on resale plates.

The conditions give currency to reports that one independent is about to issue a new tube card carrying the schedules of the leading interest.

Independent companies which have been holding nails at $3.75 per base keg are now willing to book at the $3.25 price. The action has been accompanied by an adoption o fthe old card of extras on wire. Independent makers of hoops and bands also have dropped to the Steel Corporation level.

The pig iron market continues to show weak spots whenever any business is transacted. At Chicago a purchase of 3000 tons of foundry iron and 500 tons of malleable by a leading melter was made at fully a dollar below recent quotations, and the leading merchant furnace company in that district lowered its quotation $3 per ton, while Alabama iron was offered for delivery at Chicago on a basis of $35, Birmingham, or $3 below the usual quotation. At Pittsburgh there are clear indications that pig iron will be reduced a dollar or two early in the new year.

A foreign seller of ferromanganese has quoted the new low price of $110, seaboard, but it was stipulated that the buyer pay the duty, perhaps in anticipation of the enactment of a higher tariff rate by the new Congress.

Prices on some grades of iron and steel scrap are within a few dollars of the lowest quotations on record within the past 20 years. The extent of the decline is shown by the fact that, with one exception in 1917, some scrap prices earlier this year were the highest on record.

Railroad buying is chiefly centered in rails. The 200,000 tons for the Pennsylvania has been distributed among four mills in the proportion which has usually obtained. The settlement of the rail price has hastened the scheduling on rail mill books of the smaller lines.

The Cunard Line has stopped construction on ships in England because of high labor costs. Belgium appears to be building some ships originally contracted for in England.

Pittsburgh

PITTSBURGH, Dec. 28.

The final week of the year has seen the adoption by independent steel companies of the Steel Corporation's prices on all of those products which hitherto have been held at an advance over the Corporation basis, with the exception of tubular goods, and even in the latter reports have been current that one independent was meeting the National Tube Co. schedules preparatory to issuing a new card carrying the schedules of the leading interest. Not only have those independents who have been quoting nails at $3.75 base per keg receded to a basis of $3.25, but practically all of them have abandoned the card of extras on wire adopted several months ago but not followed by the American Steel & Wire Co. Single quotations now rule on all wire products. Independent makers of hoops and bands dropped to the Steel Corporation level of 3.05c. and it is said that some of them have offered to take business at $5 per ton below that figure. It is probable that the beginning of the new year will see a restoration of uniform quotations by all makers of steel and in view of frequent reports that the Corporation prices are being shaded on several finished products, notably plates and sheets, it is possible that for a time during the early part of 1921 independent prices on actual sales will be

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 28, 1920	Dec. 21, 1920	Nov. 30, 1920	Dec. 30, 1919
No. 2X, Philadelphia‡	$34.79	$34.79	$40.79	$43.10
No. 2, Valley furnace†	35.00	35.00	38.00	39.00
No. 2 Southern, Cin'ti†	42.50	42.50	42.50	39.60
No. 2, Birmingham, Ala.†	38.00	38.00	38.00	36.00
No. 2, foundry, Chicago*	*33.00*	34.00	37.00	40.00
Basic, del'd, eastern Pa.	33.86	33.86	38.46	39.00
Basic, Valley furnace	33.00	33.00	33.00	36.00
Bessemer, Pittsburgh	36.96	36.96	36.96	38.40
Malleable, Chicago*	*33.50*	34.50	37.50	40.50
Malleable, Valley	35.00	35.00	37.00	38.00
Gray forge, Pittsburgh	35.96	35.96	38.96	38.40
L. S. charcoal, Chicago	43.50	43.50	51.00	45.00
Ferromanganese, Atl. port	110.00	110.00	125.00	130.00
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$55.00	$45.00
O.-h. rails, heavy, at mill	47.00	47.00	57.00	47.00
Bess. billets, Pittsburgh	43.50	43.50	43.50	48.00
O.-h. billets, Pittburgh	43.50	43.50	43.50	48.00
O.-h. sheet bars, P'gh	47.00	47.00	47.00	50.00
Forging billets, base, P'gh.	51.00	51.00	56.00	64.00
O.-h. billets, Phila.	49.24	49.24	55.74	59.00
Wire rods, Pittsburgh	57.00	57.00	57.00	60.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.85	3.85	4.35	3.745
Iron bars, Pittsburgh	*3.38*	3.50	3.63	3.50
Iron bars, Chicago	3.25	3.25	3.75	2.90
Steel bars, Pittsburgh	2.35	2.35	2.35	2.75
Steel bars, New York	2.73	2.73	2.73	3.27
Tank plates, Pittsburgh	2.65	2.65	2.65	2.65
Tank plates, New York	3.03	3.03	3.03	3.02
Beams, etc., Pittsburgh	2.45	2.45	2.45	2.45
Beams, etc., New York	2.83	2.83	2.83	2.82
Skelp, grooved steel, P'gh.	2.65	2.65	3.00	2.45
Skelp, sheared steel, P'gh.	2.65	2.65	3.00	2.65
Steel hoops, Pittsburgh	3.05	3.05	3.05	3.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 28, 1920 Cents	Dec. 21, 1920 Cents	Nov. 30, 1920 Cents	Dec. 30, 1919 Cents
Sheets, black, No. 28, P'gh.	4.35	4.35	4.85	4.35
Sheets, galv., No. 28, P'gh.	5.70	5.70	6.00	5.70
Sheets, blue an'l'd, 9 & 10.	3.55	3.55	3.90	....
Wire nails, Pittsburgh	3.25	3.25	3.25	4.50
Plain wire, P'gh	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.10	4.10	4.10	4.45
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$22.00	$22.00	$27.00	$31.00
Carwheels, Philadelphia	25.00	25.00	30.00	30.00
Heavy steel scrap, P'gh.	15.00	15.00	20.00	25.00
Heavy steel scrap, Phila.	14.50	14.50	17.00	22.50
Heavy steel scrap, Ch'go.	15.50	15.50	17.00	23.50
No. 1 cast, Pittsburgh	25.00	25.00	29.00	30.00
No. 1 cast, Philadelphia	22.50	22.50	31.00	33.00
No. 1 cast, Ch'go (net ton)	*13.50*	17.50	21.50	33.50
No. 1 RR.wrot, Phila.	20.00	20.00	23.00	31.00
No. 1 RR. wrot, Ch'go (net)	14.00	14.00	15.50	24.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$5.50	$5.50	$7.50	$6.00
Furnace coke, future	6.60	6.60	9.00	6.00
Foundry coke, prompt	6.50	6.50	8.50	7.00
Foundry coke, future	8.50	8.50	10.00	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.75	13.75	14.00	19.50
Electrolytic copper, N. Y.	*13.25*	13.50	13.50	19.25
Zinc, St. Louis	*5.60*	5.75	5.60	9.00
Zinc, New York	*5.60*	5.75	6.00	9.35
Lead, St. Louis	*4.50*	4.60	5.25	7.50
Lead, New York	*4.50*	4.60	5.25	7.75
Tin, New York	*33.50*	34.00	33.50	59.25
Antimony (Asiatic), N. Y.	*5.25*	5.50	5.75	9.62½

The above prices are for domestic delivery and do not necessarily apply to export business.

below the Steel Corporation levels, in marked contrast to the situation of the greater part of the past year.

The year goes out with business at an extremely low ebb and very few releases being made against suspended orders. This condition finds close reflection in plant operations of the independent companies in this and the nearby districts. Several companies are entirely idle and including those companies which are running as high as 50 per cent it would seem that a fair estimate of the present active independent capacity would be in the neighborhood of about 25 per cent.

The Steel Corporation meanwhile maintains the recent high rate of operations, the lowest subsidiary being the American Steel & Wire Co., which, however, is reported to be running about 80 per cent of capacity. Apparently the efficiency of labor in the Corporation plants has increased markedly for, though some capacity is idle, production records have been achieved in the recent past in both ingots and finished products. In view of the fact that its shipments are unhampered, there is an impression that the statement of unfilled tonnages for December will show an even greater decrease than that for November, when its obligations declined more than 815,000 tons. All of the subsidiaries have had a considerable amount of business suspended, but cancellations to date have involved only a relatively small tonnage.

Wage readjustments still are being discussed, but no definite announcements have been made by companies in this and nearby districts, save that by the Wheeling Steel Corporation. It is believed that the Steel Corporation will move extremely slowly in the matter of cutting wages and among the independent companies the tendency is to see living costs down before any action is taken.

A reduction of from two to three dollars per ton is likely to be announced in pig iron prices with the opening of the New Year. One large merchant interest has made a calculation of probable producing costs as of Jan. 1 and figures on being able to name a price of $30, Valley furnace, on basic or $32 on Bessemer. Other grades are likely to decline in sympathy.

The decline in coke prices has been halted by a sharp falling away in production and scrap prices also have steadied slightly, since they are down to levels at which dealers feel safe to buy and lay down the material on their yards.

Pig Iron.—Business is largely at a standstill. The week has not been marked by a sale of any importance, although a merchant interest with furnaces in the Valley recently reserved 5000 tons of foundry iron for one of its regular customers, the iron to be shipped during the first half of next year on a basis of prices at time of shipment. No change is possible in prices in the absence of important transactions. Revision downward will be possible Jan. 1 on the new basis of costs in the steel making grade, and as one merchant interest is said to be quoting No. 2 foundry at $33, Valley furnace, it is probable the beginning of the new year also will see the disappearance of the present price of $35. Only two of the nine merchant furnaces in the Shenango Valley now are making iron, these being the furnace of the Stewart Iron Co., Sharon, Pa., and the Ella furnace at West Middlesex, Pa., operated by E. W. Mudge & Co., Pittsburgh. These stacks are expected to go out at the end of the month. All five of the merchant furnaces in the Mahoning Valley are in operation, but

that of the Penn Iron & Coal Co. at Dover, Ohio, soon will go out.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$33.00
Bessemer	35.00
Gray forge	34.00
No. 2 foundry	35.00
No. 3 foundry	34.50
Malleable	35.00

Ferroalloys.—One maker of spiegeleisen who has been quoting average 20 per cent material at $75, furnace, has cut the price $10 per ton, and is understood to have named a price as low as $58 furnace against an inquiry for from 500 to 800 tons for first quarter of 1921 shipment. The market does not appear to be quotable at higher than $60 furnace, though nominal asking prices of makers range from $65 to $70. Buyers claim to have been offered resale spiegeleisen as low as $40 furnace, and some of them are talking $35 furnace as the price at which they will re-enter the market. Business in ferromanganese is at a standstill and no very clear idea on prices is obtainable. Domestic makers still are quoting 76 to 80 per cent alloy at $150 seaboard, but admit that no sales have been made and also that they are waiting for the market to digest resale offerings and for buyers to evince some interest before making any change in quotations. Trading in ferrosilicon and silvery iron is nil and prices are unchanged entirely because of the lack of sales upon which to hang new quotations.

We quote 76 to 80 per cent domestic ferromanganese at $150, seaboard British, $140 on direct sale; resale tonnages $105 to $110 seaboard. We quote average 20 per cent spiegeleisen nominal at $58 to $60 furnace, on direct business and $40 to $45 for resale tonnages 50 per cent ferrosilicon, nominal, $75 to $80 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $61; 10 per cent, $64.50; 11 per cent, $67.80; 12 per cent, $71.10. Silvery iron, 6 per cent, $51.50; 7 per cent, $53; 8 per cent, $55; 9 per cent, $57; 10 per cent, $59.50; 11 per cent, $62.80; 12 per cent, $66.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Plates.—Talk that less than 2.65c. is being done persists, but lacks substantiation. Independent makers disclaim any cutting of the regular price, claiming that they are not being called upon at present to make any quotations. Business is extremely slow and only the Steel Corporation mills are at all well engaged. We note sale of one round lot tonnage at 2.65c., the business being placed by a buyer who claimed he had been quoted 2.50c.

We quote sheared plates of tank quality ¼ in. and heavier at 2.65c., Pittsburgh, this being the quotation of both the Carnegie Steel Co. and the leading independents.

Billets Sheet Bars and Slabs.—Almost nothing is going on, due to the fact that so much finishing capacity is idle this, the last, week of the year. Exclusive of the pipe mills, it is doubtful whether as much as 25 per cent of the independent capacity is active this week. We note an inquiry for 200 to 300 tons of rerolling billets from a brokerage interest against which a price as high as $45 Youngstown was named. The sale has not yet been closed. Generally, demands for billets, sheet bars and slabs are lacking and a fairly common tendency to hold up shipments against contracts is noted. Independent sheet makers regard $47 as rather above what they can afford to pay for sheet bars, claiming that while they could break even on the heavier gages at this price, they would lose on the lighter gages.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $43.50 to $45; 2 x 2-in. billets, $47 to $48.50; Bessemer sheet bars, $47; open-hearth sheet bars, $47, and forging billets, ordinary carbons, $51 to $55 base; slabs, $46; all f.o.b. Youngstown or Pittsburgh mill.

Structural Material.—The Standard Oil Co. of New Jersey has closed for 2000 tons for a new office building at Baltimore, with the McClintic-Marshall Co. This is the only important award reported here and stands out with unusual prominence because generally business is quite as slow as it has been at any time in the past few months. It is understood that the Mellon National Bank of this city has indefinitely deferred the new bank building against which it recently took bids. Plain material is extremely dull and independent capacity this week is largely idle. Prices are given on page 1761.

Wire Rods.—The market is extremely dull both as regards new demands and specifications against old orders. All companies are quoting $57 on the base size of soft rods. Prices are given on page 1761.

Wire Products.—Independent companies which have been holding nails at $3.75 base per keg, Pittsburgh, have generally receded to the Steel Corporation price of $3.25. This action has been accompanied by a readoption by the independent companies of the old card of extras on wire which means that wire of No. 9 gage is restored as the base, replacing No. 8 gage, the base in the card of extras which independent companies have employed in the past few months. New business in wire products has been very light and some difficulty has been experienced even in securing shipping instructions against old orders or in releases against suspended tonnages.

We quote wire nails at $3.25 base per keg, Pittsburgh, and bright basic and Bessemer wire at $3.25 base per 100 lb., Pittsburgh.

Hot-Rolled and Cold-Rolled Strips.—Practically all of the independent capacity is idle this week and while some makers are planning a resumption on Jan. 3, it is doubtful whether full operations will be attained until well after the turn of the new year. There seems to be a fair backlog of unfilled orders in hot-rolled strips, but not a great deal in cold-rolled. Current demands are very small. All makers are holding hot-rolled strips at 3.30c. base, and cold-rolled at 6.25c. base.

Cold-Finished Steel Bars.—The market still is quoted at 3.60c. base by all makers, but this is purely nominal in the absence of any important new business. In addition to the fact that this is the closing week of the year and a time when business usually is slack, the fact that the automotive industry, which is the principal user of this form of steel, is not yet out of the woods keeps down the demand. Some makers are operating as high as 40 to 50 per cent of capacity, but in such cases production is largely for stock and plants kept going chiefly to maintain working organizations.

Hoops and Bands.—The interest which hitherto has been quoting 3.50c. in the past week has receded to the Corporation price of 3.05c. It is reported that one independent has expressed a willingness to take business at 2.85c., but this cannot be confirmed.

Nuts, Bolts and Rivets.—Year end dullness prevails with buyers disinclined either to make large new purchases or to specify at all freely against old orders. Prices and discounts given on page 1761.

Sheets.—The wide variance between operations of the leading interest and those of the independent makers continues, the former having about 95 per cent of its mills running, as compared with only about one-third of the independent mills in operation. The American Sheet & Tin Plate Co. reports the release of a considerable amount of suspended business in the past week and more of a disposition of its customers to place requirements for the first half of 1921. Independent companies are not yet getting much 1921 business nor are they getting many releases on orders against which shipments have been suspended. It is doubtful whether much of the idle independent capacity will start up until well after Jan. 1. Unverified reports are current that some of the independent companies would shade regular market quotations on desirable business. Prices are given on page 1761.

Tin Plate.—The market remains extremely quiet as to both prompt and future requirements and in the case of sheets the American Sheet & Tin Plate Co. is operating much more fully than the independent companies. It is doubtful if there will be much new first quarter business, for practically all of the container manufacturers have much tonnage due them on orders originally placed for last half of 1920 delivery. Stocks of canned perishable food, fish and condensed milk are reported

to be heavy and this may have a considerable bearing on the tin plate requirements, at least of the first quarter of next year.

Iron and Steel Pipe.—Although the independent makers have had a number of suspensions of shipments until after Jan. 1, and also some cancellations, they still are able to ship all the pipe they are producing and for that reason are able to maintain their prices, which range from $7 to $10 per ton above those of the National Tube Co. If the independent market is easier, it is only to the extent that buyers are able to secure accommodations in places where hitherto they have been unable to place orders. It is estimated that more than 90 per cent of the pipe making capacity of the country today is in operation, or almost double the present rate of operations in other kinds of finishing mills. Discounts are given on page 1761.

Iron and Steel Bars.—A further cut of $10 per ton has been announced by makers of iron bars in this district who now are quoting refined bars at 4.25c. to 4.50c. Though makers of these bars have a fair amount of business on their books only a little of it is live, and new demands are extremely light. On common iron bars the market is quotable at 3.38c. to 3.50c., these being the delivered prices on Eastern and Middle Western makers. Steel bars are slow of sale and no trouble now is being experienced by buyers in placing business at 2.35c.

We quote steel bars rolled from billets at 2.35c.; reinforced bars, rolled from billets, at 2.35c., base; common iron bars, 3.38c. to 3.50c., delivered Pittsburgh; refined iron bars, 4.25c. to 4.50c., in carloads, f.o.b. mill, Pittsburgh.

Old Material.—Conditions are practically the same as they were a week ago, with absolutely no demand coming from melters, most of whom are holding up shipments against purchases and in a number of instances seeking to cancel tonnages still due them on old contracts. The only buying that is being done is by dealers who are laying the material down on their yards. These transactions are establishing current prices, but the quotations are not a safe guide to what steel manufacturers and foundry interests would be called upon to pay if they were to enter the market. The Pennsylvania Railroad Eastern region is offering 18,225 gross tons of scrap, bids for which are to be in by Jan. 4.

We quote for delivery to dealers' yards in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$15.00 to $16.00
No. 1 cast, cupola size	25.00 to 26.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	17.00 to 18.00
Compressed sheet steel	13.00 to 14.00
Bundled sheet sides and ends, f.o.b. consumers' mills Pittsburgh district	11.00 to 12.00
Railroad knuckles and couplers	15.50 to 16.50
Railroad coil and leaf springs	16.00 to 17.00
Railroad grate bars	17.00 to 18.00
Low phosphorus melting stock, bloom and billet ends, heavy plates ¼ in. and heavier	24.00 to 25.00
Railroad malleable	16.00 to 17.00
Iron car axles	36.00 to 37.00
Locomotive axles, steel	32.00 to 33.00
Steel car axles	22.00 to 23.00
Cast iron wheels	23.00 to 24.00
Rolled steel wheels	15.50 to 16.50
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends at origin	16.00 to 17.00
Heavy steel axle turnings	15.00 to 16.00
Short shoveling turnings	13.00 to 14.00
Heavy breakable cast	19.00 to 20.00
Stove plate	17.00 to 18.00
Cast iron borings	13.00 to 14.00
No. 1 railroad wrought	16.00 to 17.00

Coke.—The market on spot offerings of beehive oven coke is not quotably changed from that of a week ago. Operators who have not shut down and have some tonnage for sale generally are asking $6 per net ton, oven, for furnace grade and $1 a ton more for 72 hr. fuel. However, these prices are maximum and also extreme, and $5.50 and $6.50 respectively find more basis in sales. Fewer merchant beehive ovens are in operation this week than at any other time before for fully a year, suspensions being forced by the sharp recession in consumption and a desire to avoid burdensome accumulations. Tonnages loaded on cars still are selling at about $5 per net ton regardless of grade by operators preparatory to putting out ovens and desirous of avoiding the cost of dumping the coke on the piers and its subsequent picking up. It now transpires that some of the ratio contracts in furnace coke for first half of next year carry a minimum price of $5.75 per net ton. Furnace coke moving on December contracts made on the ratio of five to one on Valley basic pig iron is being billed at $6.60, this being one-fifth of the present nominal price of that grade of pig iron. So far as can be learned, no flat price contract has been made for next year in furnace coke. Makers of reputable brands of foundry coke still are quoting from $8.50 to $10 on first half contracts, but the lowest figure is at least $1 a ton above what might possibly be done and even more in excess of what consumers now feel they can afford to pay.

British Iron and Steel Market

Many Plants Shut Down Over Holiday Period—Further Price Reductions Expected

(By Cable)

LONDON, ENGLAND, Dec. 28.

Holiday stoppages among British steel plants are general and more prolonged than usual. Reductions in prices are expected early in the new year.

The steel market is depressed, but there has been no further lowering of prices. There is practically no new business moving.

The Cunard Line is reported to have ordered suspension of work on all vessels now building, owing to the high cost of labor. The shipbuilding output of the Clyde district for 1920 is 263 vessels of a total tonnage of 669,960.

The Richards, Thomas, Llanelly and Swansea plants are idle owing to lack of orders.

Belgium is offering bars, beams, channels and angles at £12 per ton; plates, ¼ in. and upward, at £17 10s. per ton, both f.o.b. Antwerp; billets, £11 15s., delivered consumer's works here.

Tin plates are dull and easier. Many mills are remaining closed. It is estimated that the Welsh production will be down to 50 per cent by Jan. 1.

We quote per gross ton except where otherwise stated, f. o. b. maker's works, with American equivalent figured at $3.50 for £1, as follows:

Ship plates	£24	10	to	£28	0	$86.00	to	$98.00
Boiler plates	31	0	to	33	0	108.50	to	115.50
Tees	25	0	to	27	0	87.50	to	94.50
Channels	24	5	to	26	5	84.88	to	91.88
Beams	24	0	to	26	0	84.00	to	91.00
Round bars, ¾ to 3 in.	26	10	to	29	10	92.75	to	103.25
Rails, 60 lb. and up	25	0	to	27	0	87.50	to	94.50
Billets	15	10	to	16	10	54.25	to	57.75
Sheet and tin plate bars, Welsh	16	0	to	17	10	56.00	to	61.25
Galvanized sheets, 24 g.	30	0	to	32	0	105.00	to	112.00
Black sheets, 24 g.	34	10				120.75		
Tin plate base box	1	14				5.95		
Steel hoops	27	0				94.50		
Cleveland basic iron	11	15				41.13		
West Coast hematite	13	15				48.13		
Cleveland No. 3 foundry	12	7½				43.31		
Ferromanganese	32	0	to	33	0	112.00	to	115.50
Coke	3	2¾				10.98		

Business Generally at a Standstill—Lower Prices Acknowledged Necessary

LONDON, ENGLAND, Dec. 13.—For the present the purchasing power of the world seems to be exhausted and for such trade as is to be done the keenest competition has set in. Whether the present depression

will act as a tonic remains to be seen. It certainly ought to do so. The world's demand for commodities is not small; it is the price which is the vital factor. Although goods are wanted, the world cannot afford to pay for them. The remedy does not appear to be restricted production as preached by labor, but enlarged output. Lower price levels must be regarded as inevitable, and business must be readjusted accordingly.

In iron and steel, for weeks past the Cleveland pig iron trade has been endeavoring to recover from the stoppage and disorganization caused by the coal strike, but as it takes time to recover normal output, the iron turned out has largely been of inferior grades. With the supply of Cleveland foundry metal below home requirements, it has been so far impossible to remove the embargo on exports. While these remarks apply to Cleveland iron it is noticeable that there is a growing disinclination on behalf of founders to pay the prices generally asked by home makers in this country for foundry iron. This is not surprising in view of the fact that Belgian foundry iron can be had at about £10 c. i. f.

In finished iron and steel, it is generally considered that a drastic revision in prices will be seen in the New Year. Competition has increased in the export trade, and British manufacturers are now quietly offering discounts and rebates as well as price concessions. Overseas buyers, however, are unable to make purchases except on long credit terms, and this has reduced the amount of business passing. Generally speaking there is still a feeling of acute depression and markets have a drooping tendency. The shipbuilding yards have a fair amount of business still on hand, but the outlook is distinctly bad, owing to the lack of new orders, and the fact that second hand ships can be had at very much under the cost price of new vessels. The strike of shipyard joiners and carpenters which is growing in the country has extended to London, and 2,000 men are out from Thames-Side works.

At the general meeting of Messrs. Richard Thomas & Co., Ltd., a few days ago somewhat significant remarks were made by the vice-chairman, Lord Bledisloe of Lydney, in regard to the trade position. He pointed out that the general element of doubt as regards the future was foreign competition from makers who are employing less costly labor and who are able to put their products of a similar kind to those of his company upon the market at a considerably lower cost. The time might come when British makers would have to ask the government to extend to them some measure of fiscal protection to meet these conditions. He, however, omitted to say that before the war one of the largest importers of cheap foreign steel was R. Thomas & Co.

It has been reported that a fusion is to take place in South Wales between Baldwins and the British Mannesmann Tube Co. The Mannesmann Co. has works at Swansea, and Panteg (Monmouthshire), while Baldwins are at Landore near Swansea.

Wage Reductions at Cleveland

CLEVELAND, Dec. 28.—The Bourne-Fuller Co. has made a 15 per cent reduction in wages in its Upson steel plant and a corresponding reduction of all rates on a piecework, tonnage and hourly basis, and has also eliminated time and a half for overtime. The common labor had been paid 56c. an hour. The reduction also applies to employees in its blast furnace and bolt and nut works. The Otis Steel Co. has also eliminated time and a half for overtime, but has not yet reduced wages. Some of the local independent mills now have the readjustment of wages under consideration and will probably make cuts from 20 to 25 per cent Jan. 1.

Increasing the Foundry Output

Suggestions for increasing the output of the foundry were given in a paper on "The Equipment of the Foundry—To-day and in the Near Future" presented by H. R. Atwater, Osborn Mfg. Co., Cleveland, at the annual meeting of the American Foundrymen's Association, Columbus, Oct. 4 to 8. Lack of modern equipment was one fault of many foundries, the speaker said, but this will have to be installed, for labor will not be available at a much lower figure for a very long time to come. Mr. Atwater outlined a list of questions calculated to reveal shortcomings in casting plants as follows:

> Is my business properly housed? Are the various processes in production located and routed so as to necessitate the fewest waste steps?
>
> Are my buildings as pleasant places in which to work as those of neighboring plants? Is the heating right? Are they ventilated to remove disagreeable dust and gases? Are sanitary conditions good; for instance, are the toilets and the rest room for the women in the core room sufficient and are they properly segregated?
>
> Have I competent foundry foremen and superintendents backed by the necessary mechanical training and skill to recognize, install properly and operate the many labor saving devices used by most progressive competitors?
>
> Are these men actually leaders of my manpower? Are they in the true sense managers?

That waste and inefficiency are prevalent in many plants, the speaker pointed out, is due to lack of proper mechanically trained men to take care of equipment. "It is a fact," he said, "that in many plants where thousands of dollars have been invested in equipment it is allowed to operate in dirt and sand, to become rusty from lack of lubrication, or is left standing with very little or no attention in exposed places." Further, "the ability to produce castings on modern type machines with the class of help available requires able instructors with mechanical ability, first to rig the equipment properly, and second to operate it effectively. There is a great lack of the right kind of men trained in the use of equipment and pattern rigging and with proper mechanical training to install and instruct others in the working of equipment." To overcome this Mr. Atwater suggested the establishment of a modern school of foundry practice where men who wish to take up the practical and mechanical work of the present day foundry may be sent to be educated and schooled in the matter of proper rigging, handling of equipment, cost accounting, etc. In such a school standardized practices could be taught that could be outlined by a faculty of foundrymen to be chosen by the association. Prospective foremen or plant engineers could be sent to serve a definite apprenticeship and turned out with a certificate or diploma. This, it was concluded, would go a long way toward supplying the need of the industry, a need that will be felt more keenly and to a greater degree as competitive conditions bring about a still larger use of machines and various labor saving devices in the foundry.

Reports of free employment bureaus operated by the Michigan State Labor Department show that there has been a decline of about 50 per cent in the labor requirements of Michigan employers.

The Crane Co., Bridgeport, Conn., this year will distribute $600,000 in bonus money to its employees on the payroll Dec. 1. Those employees laid off because of the lack of work will also share in the bonus.

The American Wrecking & Salvage Co., dealer in scrap metals, 732 West Harrison Street, Chicago, has leased a block between Archer and Kolman avenues, Sixty-first Street and the Belt Railroad, and will use it as a scrap storage yard.

The Erie Crucible Steel Co., Erie, Pa., will shortly place contracts for extensions to its plant. These will include three buildings. Four additional furnaces and a gas producer will be installed. With the extensions the capacity will be increased from 25 to 200 tons per month.

Chicago

CHICAGO, Dec. 28.

A large local melter has bought 3000 tons of foundry and 500 tons of malleable at less than $34 base, Chicago, for No. 2 foundry, and while the terms of the transaction have not been made public, it is thought that $33, or even as low as $32, was done. Concurrent with this transaction, the leading representative of merchant stacks in this territory has reduced prices $3 a ton, making the present quotation on No. 2 foundry $35, Chicago, furnace. Generally speaking, the pig iron market is quiet while the demand for finished iron and steel is at an exceptionally low ebb. The production situation in this section is much the same as a week ago, with further contraction in output in some directions. One of the Mayville merchant furnaces has been put out, and the local tube manufacturer is reducing operations. The Illinois, Inland, Wisconsin and Republic companies are operating on about the same scale as last week.

Pig Iron.—A large local consumer has bought 3000 tons of foundry and 500 tons of malleable for January shipment. Although the terms of the purchase have not been made public, it has been ascertained by process of elimination that lower than $34, Chicago, for No. 2 foundry was done. Other offerings and sales of resale material would indicate that $33 base, Chicago, or even $32, may have been named in this instance. Producers have taken another step in the direction of the resale level, the leading Northern merchant having reduced prices $3 a ton to $35 base, furnace, for No. 2 foundry. A Southern furnace has named $35 base, Birmingham, on inquiries in this territory, and as noted a week ago, another Southern producer is offering stocks of higher silicon iron at $32 base. With the approach of the end of the year it is felt that much resale iron offered for the purpose of establishing inventory prices will be withdrawn from the market. If this proves true, some observers believe that the market will stabilize and consumers who have delayed buying because of the declining tendency of prices will commence to close for their needs. Their requirements, of course, will be subnormal for a time because of reduced operations, as few melters are running full. At the same time, it is to be noted that stocks on blast furnace yards are not large, as has been generally true in previous periods of depression. Producers are following the policy of shutting down rather than to pile iron. One more furnace represented by the leading Northern merchant, a Mayville stack, has been blown out. This makes a total of five idle furnaces in the group selling through that agency.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton.

Lake Superior charcoal, averaging sil. 1.50, 1921 delivery (producers' price, deliv. at Chicago)	$48.50
Lake Superior charcoal, prompt shipment (resale)	43.50
Northern coke, No. 1, sil. 2.25 to 2.75	$34.25 to 36.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	33.00 to 35.00
Northern high phos	33.00 to 35.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	43.67 to 46.67
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	41.92 to 44.92
Southern foundry, sil. 1.75 to 2.25	40.67 to 43.67
Malleable, not over 2.25 sil	33.50 to 35.50
Basic	33.00 to 35.00
Low phos. Eastern furnace (copper free)	47.00 to 49.00
Silvery, sil. 7 per cent	47.53 to 50.53

Ferroalloys.—A foreign producer is offering ferromanganese at $110, tidewater, for next year's delivery, any import duty which may be levied by the Government to be paid by the purchaser. This is the lowest producer's quotation thus far reported, but for early delivery resale material is available for as low as $110, delivered. Spiegeleisen has weakened, resale material being available at $45, f.o.b. shipper's plant.

We quote 75 to 80 per cent ferromanganese, resale, $110 to $120, delivered 50 per cent ferrosilicon at $80 to $85, delivered spiegeleisen, 18 to 22 per cent, resale, $45 to $50, f.o.b. shipping point.

Rails and Track Supplies.—The railroads are becoming increasingly conservative and are not only curtailing purchases of track supplies, but in a few cases have asked that business be cancelled or suspended for later shipment. Iron tie plates, which have been quoted nominally at 3.75c. for a number of weeks, are expected to be reduced to a figure comparable to that named on steel tie plates.

Standard Bessemer rails, $45 to $55; open-hearth rails, $47 to $57; light rails, 2.45c. to 3c., f.o.b. makers' mills.

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.60c., Pittsburgh. Steel tie plates, 3c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron (nominal), 3.75c. f.o.b. makers' mills.

Bars.—Buying of mild steel bars is at a low ebb, but indications point to increased interest on the part of consumers in January. The demand for bar iron has been adversely affected by the conservatism of the railroads. Among the few inquiries in the market is one from a local industrial for 300 tons. While bar iron is more commonly quoted at 3.38c., Chicago, at least one mill has named 3.25c. on a number of inquiries. Buying of rail carbon steel bars has practically ceased and hard steel bar mills in this territory remain idle.

Mill prices are: Mild steel bars, 2.35c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 3.25c. to 3.38c., Chicago; rail carbon, 2.60c. to 2.75c. mill.

Jobbers quote 3.48c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.25c. for rounds and 5.75c. for flats, squares and hexagons, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. on orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 3.48c. base.

Structural Material.—There is practically no demand for plain material, and little new business is expected until next month. No fabricating awards have been reported and inquiries are few. The general contract for a bascule bridge at Racine, Wis., involving 650 tons, has been let to Greiling Brothers, Green Bay, who will sublet the fabrication. The Chicago, Milwaukee & St. Paul is taking bids today on 145 tons for track elevation work at Howard Street, Chicago. The Orpheum Theatre, Minneapolis, involving 1000 tons, which was recently reported let, is up for bids again.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.58c. for materials out of warehouse.

Plates.—Holiday dullness has caused even a further curtailment in buying, and few new orders are looked for until after Jan. 1. The limited number of inquiries fails to disclose whether any concessions under the Industrial Board basis will be made. Mills assert that present prices bring little or no profit and often a loss, and that no further cutting can be expected. Consumers who have made offers of business at lower prices have not found takers. The Louisville & Nashville inquiry for cars is still unclosed and the Duluth inquiry for 1800 tons of plates, shapes and bars is still pending. Reports from the Southwest indicate that oil producers have reduced output from 30 to 50 per cent. New tank construction work in that territory is not looked for.

The mill quotation is 2.65c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.73c. for plates out of stock.

Cast Iron Pipe.—A holiday lull hangs over the market, but producers look forward to better business early next year, it being felt that the new prices will prove attractive. Spring Wells, Mich., has rejected bids on 400 tons.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $69.10; 6-in. and above, $64.10; class A and gas pipe, $4 extra.

Bolts and Nuts.—On the whole, the market is dull, although large inquiries from the Ford Motor Co. are a source of encouragement. The company wants 21,000,000 rivets, 10,000,000 nuts and 3,000,000 bolts. The Ford automobile plant is now turning out 3400 cars a day, but the tractor plant is idle. The General Motors Corporation is reported to have placed a million dollar order for Oldsmobile bodies. Bolt and nut makers are

closing some first quarter contracts. For manufacturers' prices, see finished iron and steel, f.o.b. Pittsburgh, page 1761.

Jobbers quote structural rivets, 5.08c.; boiler rivets, 5.18c.; machine bolts up to ¾ x 4 in., 40 per cent off; larger sizes, 30 off; carriage bolts up to ¾ x 6 in., 25 off; larger sizes, 25 off; hot pressed nuts, square tapped and hexagon tapped, 35 off; blank nuts, 85 off; coach or lag screws, gimlet points, square heads, 45 per cent off. Quantity extras are unchanged.

Railroad Rolling Stock.—The Missouri Pacific, which recently bought 25 heavy Mikado type locomotives from the American Locomotive Co., has ordered five Mountain type, five Pacific type and 15 switch engines from the same builder. The Western Pacific has bought five heavy Mikado type engines from the American Locomotive Co., with an option on five more.

Sheets.—Inquiries are few, but probaby more numerous than for plates, shapes and bars. In some cases, consumers in evident need of material, have tried to place orders on the condition that concessions are to be made under present prices. So far as can be determined, mills are accepting no business on that basis. Galvanized is in greater demand than black or blue annealed.

Mill quotations are 4.35c. for No. 28 black; 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 4.68c.; No. 28 black, 5.73c. to 6c.; No. 28 galvanized, 7.35c.

Wire Products.—Business has fallen off, but a resumption of buying, particularly by jobbers, is looked for in January. In this connection, it is to be noted that manufacturers, because of reduction operations, will probably turn to the jobbers for their immediate needs rather than to place order for larger amounts with the mills. The plants of the leading producers are still operating at close to 100 per cent of capacity. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1761.

Old Material.—There is even less buying by consumers than heretofore, but few price recessions are to be noted, and on the whole the market has a firmer tone. The Burlington closed today on 3000 tons and the Monon has issued a small list.

Per Gross Ton

Iron rails	$24.00 to $24.50
Relaying rails	40.00 to 45.00
Car wheels	22.00 to 23.00
Steel rails, rerolling	16.00 to 16.50
Steel rails, less than 3 ft.	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards, cut apart	15.50 to 16.00
Shoveling steel	15.00 to 15.50
Low phos. heavy melting steel	18.50 to 19.00
Drop forge flashings	12.00 to 12.50

Per Net Ton

Iron angles and splice bars	25.00 to 25.50
Steel angle bars	15.00 to 15.50
Iron arch bars and transoms	26.00 to 26.50
Iron car axles	32.50 to 33.00
Steel car axles	17.00 to 17.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	9.00 to 9.50
Cut forge	13.50 to 14.00
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
Steel knuckles and couplers	14.50 to 15.00
Coil springs	18.00 to 18.50
No. 1 cast	17.50 to 18.00
Low phos. punchings	15.50 to 16.00
Locomotive tires, smooth	11.50 to 12.50
Machine shop turnings	7.50 to 8.00
Cast borings	9.50 to 10.00
Stove plate	20.00 to 20.50
Grate bars	13.00 to 13.50
Brake shoes	11.00 to 11.50
Railroad malleable	14.50 to 15.00
Agricultural malleable	14.50 to 15.00
Country mixed	10.00 to 10.50

The Ames Iron Works, Oswego, N. Y., manufacturer of boilers, engines, etc., a branch of the Pierce, Butler, Pierce Co., Syracuse, N. Y., closed its plant on Dec. 23 for a period of 10 days. Effective with reopening, a 12½ per cent wage reduction will be operative. The company is giving employment to about 350 men.

Boston

BOSTON, Dec. 28.

Pig Iron.—Transactions in resale iron dropped to almost nothing this week, the few cars sold being mostly special analysis iron for which close to $40 delivered was paid. Foundries appear less anxious to resell iron now that a shrinkage in inventories has been recorded. Some furnace iron with a January dating has been shipped to New England under protest of melters during the past few days. One Virginia producer relining its furnaces expects to resume operations some time during February. New England foundries continue to get requests for lower 1921 prices on castings. One foundry recently took on a round tonnage of heavy castings at 5c. per lb., and has been asked for a revision to 4⅞c. Most melters, however, are slow to reduce prices on castings. Delivered resale pig iron prices follow:

East Penn., silicon 2.25 to 2.75	$40.31 to $45.31
East. Penn., silicon 1.75 to 2.25	39.06 to 44.06
Buffalo, silicon 2.25 to 2.75	37.71 to 41.71
Buffalo, silicon 1.75 to 2.25	36.46 to 40.46
Virginia, silicon 2.25 to 2.75	40.33 to 45.33
Virginia, silicon 1.75 to 2.25	39.08 to 45.33
Alabama, silicon 2.25 to 2.75	47.91 to 49.91
Alabama, silicon 1.75 to 2.25	46.66 to 48.66

Coke.—Slightly more interest is shown in Connellsville foundry coke, several cars having been sold since last reports at $7.50 to $8 Connellsville oven base or $13.70 to $14.20 delivered, as contrasted with $16.70 delivered where the freight rate does not exceed $3.40, the New England Coal & Coke Co. spot price. The spread in such instances is $2.50 to $3 a ton. Certain foundries continue to hold back on 1921 foundry coke contracts. The ratio of production at the Everett, Mass., ovens has not increased, there being but one battery of 50 ovens making a foundry fuel.

Finished Material.—The Bangor & Aroostook Railroad has purchased 2500 tons of 80-lb. rails from the Lackawanna Steel Co., for 1921 delivery. With the exception of the New York, New Haven & Hartford Railroad, the New England carriers have covered their 1921 rail requirements, a total of 29,000 tons having been purchased. The Boston & Maine Railroad has placed an order for seven large locomotive boilers with the American Locomotive Co. The International Engineering Works, Framingham, Mass., has a contract to supply 16 boilers for a Cuba sugar company, involving about $100,000. The Lukens Steel Co. will furnish the plates, shipments to begin at once. New York contractors were awarded the 200 tons of structural steel for the Washington and Essex streets, Boston, building. A better inquiry for wire nails at $3.25 f.o.b. Pittsburgh is reported by independent mills, and a slightly larger tonnage of small bars, flats and bands is being booked for shipment at convenience of the mill. Practically no demand for heavy iron and steel is reported. Sentiment among mill representatives is more optimistic.

Jobbers now quote: Soft steel bars, $3.70 per 100 lb. base; flats, $4.50 to $4.85; concrete bars, $4 to $4.25; tire steel, $5 to $5.50; spring steel, open hearth, $8.50; crucible, $14; steel bands, $4.65 to $6.25; steel hoops, $6; toe calk steel, $7; cold rolled steel, $5.50 to $9.50; structural, $3.70 to $5.50; plates, $4 to $4.40; No. 10 blue annealed sheets, $5.90; No. 28 black sheets, $8.15; No. 28 galvanized sheets, $9.50; refined iron, $4.65 to $5.65; best refined, $5.50; Wayne, $8.50; band iron, $4.65; hoop iron, $6; Norway, $15.

Warehouse Business.—The demand for iron and steel is confined to small lots, and bolts, nuts, horseshoes and other kinds of heavy hardware are reported as quiet. No changes in prices have been made, however.

Old Materials.—Aside from light buying of steel turnings, a few cars of blast furnace material and a few cars of pipe, the market has been inactive since last reports. Practically all 1920 mill contracts have been filled. Heavy melting steel, railroad wrought, railroad malleable, rerolling rails, steel axles and blast furnace borings and turnings are easier in sympathy with outside markets. There has not been enough

doing in these materials of late to affect the market one way or the other, quotations being purely nominal. Bids are being received today by the local navy yard for 700 to 800 tons of various kinds of scrap. Large foundries are well stocked, but smaller ones do not average thirty days' supply of No. 1 cast. Local prices on old material follow:

No. 1 heavy melting steel	$9.50 to $10.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	16.00 to 17.00
Wrought pipe (1-in. in length, over 2 ft. long)	9.50 to 10.50
Machine shop turnings	9.50 to 10.00
Cast iron borings, rolling mill	10.00 to 11.00
Cast iron borings, chemical	11.00 to 12.00
Heavy axle turnings	9.50 to 10.00
Blast furnace borings and turnings	7.50 to 8.00
Forged scrap	9.00 to 9.50
Bundled skeleton	9.00 to 9.50
Street car axles, steel	18.00 to 19.00
Car wheels	29.00 to 30.00
Machinery cast	27.00 to 28.00
No. 2 cast	24.00 to 26.00
Stove plate	19.00 to 20.00
Railroad malleable	16.00 to 17.00
Rerolling rails	17.00 to 18.00

Buffalo

BUFFALO, Dec. 28.

Pig Iron.—A few orders for small tonnages is the sum total of activities in this market. One interest said it was not selling any iron, but is quoting $35 base. Inquiry at that office is light but general optimism prevails with reference to conditions after the holidays. Another interest picked up a few orders. Most of this was sold at $36 base with a small part at $35. Another large producer sold less than 100 tons during the week. Most of it was at $34 and the same sales manager said he knew of no iron sold at less than that figure. Inquiry with this interest is extremely light.

We quote f.o.b. Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$37.00 to $38.00
No. 2X foundry, 2.25 to 2.75 sil.	35.25 to 36.25
No. 2 plain, 1.75 to 2.25 sil.	34.00 to 35.00
Basic	36.00
Malleable	35.00 to 36.00
Lake Superior charcoal	55.00

Finished Iron and Steel.—The week just closed was very dull with reference not only to sales but likewise to inquiry. One sales manager said his office reported no sales and little asking for prices. This same organization was still planning on early days in January to bring about a restoration of buying. An order for 10,000 tons of rails at $47 was entered for delivery in January and February. With inventories in initial stages this week and the likelihood they will be continued next week, there is no expectation of any activity until after the holidays. Wage reductions will confuse the buying interests rather than clear the situation, in the opinion of some observers. It is felt that independent prices are as low as possible. Notwithstanding this, some buyers are saying that further price reductions may come after reduced wage scales are in effect. With that in mind, buying is deferred.

We quote prices f.o.b. Buffalo as follows: Structural shapes, $3.60; plates, $3.80; plates, No. 8 gage, $4.90; soft steel bars and shapes, $3.50; hoops, $4.70; blue annealed sheets, No. 10 gage, $5.40; galvanized steel sheets, No. 28 gage, $8.50; black sheets, No. 28 gage, $7.

Old Material.—Prices are unchanged. A buyer said he could buy almost any kind of old material at figures less than asked by the largest of local dealers but no actual sales at prices less than quoted herewith could be found. It is hardly believed business will improve until the new year is well advanced into January.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$17.00 to $18.00
Hydraulic compressed	14.00 to 15.00
Low phos., 0.04 and under	25.00 to 26.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 machinery cast	26.00 to 27.00
Iron and steel axles	30.00
Car wheels	24.00 to 25.00
Railroad malleable	18.00 to 19.00
Machine shop turnings	11.00 to 12.00
Heavy axle turnings	15.00 to 16.00
Clean cast borings	12.00 to 13.00
Iron rails	25.00 to 26.00
Locomotive grate bars	15.00 to 16.00
Stove plate	17.00 to 18.00
Wrought pipe	14.00 to 15.00
No. 1 busheling	14.00 to 15.00
Bundled sheet stampings	10.00 to 11.00

New York

NEW YORK, Dec. 28.

Pig Iron.—The inquiry for 10,000 tons from the Lynchburg Foundry Co., manufacturer of iron pipe, has not developed into orders, and probably is like some other inquiries which have been put out to sound the market or to determine prices for inventory purposes. No business of importance is being transacted. Reports vary as to prices. From a source that seems trustworthy comes a report that $30 could be done on No. 2 plain at Buffalo, and similar reports as to low prices in other districts are current, but so little business has been carried on that it is almost impossible to quote with accuracy. In some cases, foundrymen have paid from $8 to $12 a ton for the privilege of canceling requests, but cancellations are not so numerous, because customers are convinced that furnaces will not cancel. It is also realized that with furnaces blowing out as rapidly as they are there may be a scarcity of iron early in the new year.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25.	$39.52 to $40.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.	37.77 to 38.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.	36.52 to 37.52
Buffalo, sil. 1.75 to 2.25	40.46 to 41.46
No. 2 Virginia, sil. 1.75 to 2.25	42.16 to 43.16

Ferroalloys.—British ferromanganese is obtainable for prompt and early delivery at $110, seaboard, and resale alloy has sold as low as $100, delivered. There is very little inquiry. The last quotation of American producers was $150, delivered, but it is probable that almost any offer of British producers would be met under competitive conditions. The spiegeleisen market is a little more active, one sale of 200 tons being reported, with others under negotiation. Values, however, have declined and the alloy from 16 per cent up to 21 per cent is obtainable as low as $45, furnace, with the probability that this could be shaded. There are foreign inquiries for low manganese alloy with some business pending. There have been no developments in the manganese ore market and quotations are nominal at 35c. to 40c. per unit, seaboard. The 50 per cent ferrosilicon market is inactive with quotations nominal at around $78 to $80 per ton, delivered. No contracts for 1921 are yet reported as having been made.

Finished Iron and Steel.—Aside from a few structural steel awards, totaling about 3500 tons, and a few other jobs which are pending, the amount of business in the local market during the past week has been practically negligible. The customary holiday-week dullness, greatly intensified, prevails. Some mill representatives have been without orders or inquiries for several days, an unusual condition even in a dull market. There seems to be a general expectation of better business after Jan. 1, but it is admitted that there is nothing very tangible upon which to base this forecast other than that buyers cannot stay out of the market indefinitely, and that the new year is the psychological time for business to show a slight betterment. It was expected that the railroads might put out some end-of-the-year inquiries for cars, steel, etc., preparatory to buying on their 1921 budgets, but such inquiries have not yet developed. In the structural steel market the principal award was 2100 tons for the new Standard Oil Co. building in Baltimore, to be fabricated by the McClintic-Marshall Co. The American Bridge Co. was awarded 600 tons for an extension of the Frankford elevated railroad, Philadelphia. An addition to the St. Mary's Industrial School, Baltimore, requiring 450 tons, went to Dietrich Brothers, Baltimore fabricators. Bids on the general contract for the new Keeler Hotel, Albany, N. Y., involving 2400 tons, exceeded estimates by about $1,000,000. A textile plant at Providence, R. I., requiring 600 tons, is also up for bids, and the Somerset Building, Boston, has been revived, estimates being asked for on 1400 tons of fabricated steel.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c.; plates, 3.03c.; shapes, 2.83c.; bar iron, flats, wider than 6 in., 4.38c., with half extras; light rounds, squares and flats, 4.88c., with full extras, and other sizes, 3.88c., with half extras.

Warehouse Business.—Dealers have a fair number of small inquiries on hand, but buying is light. Prices show no change, excepting non-ferrous metals from warehouse stocks. Some slight reductions in a few items are expected after the first of January. The market in brass and copper sheets, rods and wire is unchanged. We quote prices on page 1778.

High Speed Steel.—The situation in high speed steel remains unchanged as to prices with producers quoting the nominal price of $1.25 per lb. for 18 per cent tungsten. On orders of any size a lower quotation can be obtained. Orders of moderate size from several important users have brought a ray of encouragement to a gloomy situation.

Cast-Iron Pipe.—The holiday lull affects this line. Lower prices have not yet stimulated buying. We quote f.o.b., New York, as follows: 6-in. and larger, $63.30; 4-in., $73.30; 3-in., $83.30, with $4 additional for Class A and gas pipe.

Old Material.—Mills have not yet come into the market, so that most of the buying is among dealers, some of whom are stocking up at present low prices. Some sales have been made for the purpose of reducing inventories. In the absence of present business the trade is looking hopefully toward the new year as a time of probable improvement. One eastern Pennsylvania mill is buying heavy melting steel at $14.50, delivered; also mixed borings and turnings at $12, delivered. A railroad equipment maker is buying stove plate for New Jersey delivery at $21. A sale of 500 tons of shell scrap was made through the New York office of a scrap firm to an eastern Pennsylvania mill.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$10.50 to $11.00
Rerolling rails	13.50 to 14.00
Relaying rails, nominal	50.00 to 53.00
Steel car axles	17.00 to 18.00
Iron car axles	32.00 to 33.00
No. 1 railroad wrought	16.00 to 17.00
Wrought iron track	10.50 to 11.00
Forge fire	9.00 to 10.00
No. 1 yard wrought long	13.00 to 14.00
Light iron	5.00 to 6.00
Cast borings (clean)	10.50 to 11.50
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings	8.00 to 8.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	10.00 to 11.00
Stove plate	17.00 to 18.00
Locomotive grate bars	15.00 to 16.00
Malleable cast (railroad)	13.00 to 14.00
Old car wheels	23.00 to 24.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$24.00 to $25.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	24.00 to 25.00
No. 1 heavy cast, not cupola size	15.00 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Birmingham

BIRMINGHAM, ALA., Dec. 27.

Pig Iron.—With production down to the bone and firm intention to keep it there until things mend, Birmingham iron makers come to 1921 with no pronounced views as to the time of recovery. The outstanding item of interest following the closing down of two furnaces by the Sloss-Sheffield Steel & Iron Co. was the going on foundry of the Gulf States Steel Co., Dec. 23. This was simultaneous with closing down the open hearth department for two weeks and the wire drawing department for one week. The company will make foundry iron pending exhaustion of its supply of basic in its own mills. A curious situation is thus developed. Only five merchant furnaces are making pig iron, the two Sloss-Sheffield and one each of the Republic Iron & Steel Co., the Alabama Co. and Woodward Iron Co. The Tennessee company has two stacks on foundry and the Gulf States Steel Co. one on foundry. Both these last-named operations are for the merchant trade, the Tennessee stacks being to fill orders already booked at $38 and the Gulf States Steel Co. producing foundry aim to sell the merchant trade at that base. It is understood that there has been no hesitancy on the part of buyers of $38 iron to take the consignments at time delivery was specified in the contracts, but it has been utterly impossible to secure delivery on the $42 contracts. This is the straw that broke the camel's back and caused such a wholesale shut-down. The Tennessee company keeps going in both iron and steel departments at apparently full normal capacity, which finds justification in the regular shipments of large quantities of steel products from Mobile and New Orleans. Unquestionably the export business has saved the Birmingham district once more. Some makers report foundries as having notified them to begin delivery of held-up iron promptly after Jan. 1, it being understood that they have reduced wages and made other adjustments enabling them to manufacture at lower costs. The Sloss-Sheffield Steel & Iron Co. has just shipped 500 tons to the Pacific coast via boat out of Mobile. Inquiries for pig iron are more numerous, but have not produced business beyond car lots. One inquiry for 500 tons of charcoal iron is pending, but that business also has fallen off, following a flurry that resulted in a rather brisk buying on the $50 base.

We quote per gross ton f.o.b. Birmingham district furnace, the Tennessee company included, as follows:

Foundry, sil. 1.75 to 2.25	$38.00
Basic	37.00
Charcoal	50.00

Cast Iron Pipe.—The pipe plants with one accord shut down for the holidays. The four of the United States Cast Iron Pipe & Foundry Co. are expected to resume one by one after Jan. 1 as business justifies. The status of the sanitary shops is more problematical. Orders for gas and water pipe are numerous, but for very small quantities. The new schedule of Birmingham makers is: Water pipe, $55 for 6 in. and upwards, $60 for 4 in. Gas pipe $4 extra per ton. The United States Pipe, National Cast Iron Pipe, and American Cast Iron Pipe companies participated in a movement of 3200 tons of gas and water pipe for the Pacific coast out of Mobile the past week. Preston, Cuba, an inland town, will take 1400 tons of water pipe to be shipped out of Mobile by the United States company in the near future.

Coal and Coke.—Production of coal continues to run about 20,000 tons weekly over the normal, but the strike goes on unabated with $300,000 to $400,000 expended monthly by the International Union in maintenance of the strikers and their families. The public is very restive under this deadlock and talk of holding the strike leaders personally responsible for murders and dynamiting is on the increase. It is not impossible that some leaders will be invited to leave the State, as was done in 1908 with effectiveness. Production no longer enters into the strike. Some large contracts for 1921 coke have been booked by the standard foundry makers recently at $10.75 for a year and $11.75 for six months. A New Orleans foundry has taken 1500 tons on this base and a large car works in Texas is another. Spot foundry coke sold as high as $12 in Chattanooga during the week. Furnace coke is very soft owing to furnace slowing up and spot delivery, to keep ovens going, may be secured at $7. The contracts for 1921 foundry coke were placed after realization by the consumers that mine wages are to remain fixed until April, 1922.

Old Material.—There is a deadlock between the scrap men and the consumers. Prices quoted remain nominal, but there is an inclination to look for some real business after the new year sets in.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	$17.00 to $18.00
No. 1 heavy steel	16.00 to 17.00
No. 1 cast	27.00 to 28.00
Car wheels	27.00 to 28.00
Tramcar wheels	25.00 to 26.00
No. 1 wrought	21.00 to 22.00
Stove plate	14.50 to 15.00
Cast iron borings	7.00 to 8.00
Machine shop turnings	7.00 to 8.00

Cincinnati

CINCINNATI, Dec. 27.

Pig Iron.—Three inquiries, aggregating 6000 tons, are before the market, and it is expected that action will be taken on them this week. One of these is from the Crane Co. for its Chicago plant, one for 4000 tons of foundry, another from the American Radiator Co. for 1500 tons for its Detroit plant, shipment to be made in January. The Link Belt Co. is also inquiring for 500 tons of malleable for its Indianapolis plant. Outside of the above, the market is extremely dull and carlot sales constitute the local activity. Resale offerings are still plentiful, and while some of them may be withdrawn after Jan. 1, this iron is expected to hang over the market until a buying movement sets in. In the absence of sales of any size, it is difficult to get a line on what prices really can be made. It is almost certain that a bona fide inquiry would bring out a quotation of $35 from almost all Northern furnaces, and in this connection it is reported that on the Crane inquiry noted above a quotation which would figure $33.75, base, Northern furnace, was submitted. In the South, all producers are holding at $38, Birmingham. Jackson County silvery furnaces still maintain a price of $55, furnace, for 8 per cent, but very few sales are reported. Virginia furnaces are known to have quoted $36, furnace, in the East. Resale tonnages are available from all districts at about $4 under the above prices. No attention apparently is being paid to silicon differentials in disposing of resale tonnages, as we note offerings of $35 for any grade up to 3.25 to 3.75 per cent silicon. Production of pig iron was further curtailed in this district last week by the banking of Belfont furnace at Ironton, and the second stack of the Ashland Iron & Mining Co., at Ashland, Ky. Three furnaces are now active in southern Ohio: Globe at Jackson, Etna at Ironton and Miami at Hamilton.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$38.50 to $42.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	39.75 to 41.75
Ohio silvery, 8 per cent sil	52.52 to 57.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.52 to 37.52
Basic northern	35.52 to 37.52
Malleable (nominal))	38.52 to 40.52

Warehouse Business.—Warehouse business continues dull. While some small orders are being received, the usual pre-inventory quiet is evident, though to a greater degree than for some years past. Jobbers, however, are confident that the first of the year will bring better business. No price changes are reported, and local warehouses still quote as follows:

Coke.—The coke market is extremely dull. Connellsville coke is quoted at $5.50 for furnace and $7 to $7.50 for foundry. Some Wise County furnace coke was offered to-day at $7. One producer of by-product coke has announced its January price as $9, Connellsville basis.

Finished Material.—It is reported that an offer of 500 tons of steel bars was turned down by a northern Ohio mill, on the ground that present operating costs would not allow the filling of the order at a profit. It is understood the order called for January and February delivery, and was to carry a 2.35c. base price. So far as known, the business has not been placed. Some specifications continue to be received by mill representatives in this territory, among them being one for 225 tons of bars, for first quarter delivery. Some sales of carload lots for early delivery are also reported. The sheet market is quiet, although a number of mills have received orders from regular customers for the first quarter. All of this business was taken on the 4.35c. base, for black, and 5.70c. base for galvanized. Reports of lower prices continue to be heard, but are apparently without foundation. Wire products are reported to be fairly active, and a Kentucky jobber is reported to have placed an order for 20,000 kegs of wire nails with a southern Ohio mill at $3.25 per keg. A local jobber has also placed an order for five carloads of nails at the same figure. The structural market is stagnant. Most of the mills operating in the southern part of the State have closed down for the holidays, and will likely re-open the first week in January.

Iron and steel bars, 3.58c. base; shapes, 3.68c. base; hoops and bands, 3/16 in. and lighter, 4.28c.; plates, 3.88c. base; reinforcing bars, 3.65c.; cold rolled rounds, 1½ in. and over, 5.20c.; under 1½ in. rounds, and flats, squares and hexagons, 5.70c.; No. 10 blue annealed sheets, 4.78c. base; 28-gage black sheets, 6c. base; 28-gage galvanized sheets, 7c. base; wire nails, $4 per keg, base.

Old Material.—The scrap market is absolutely dead, according to dealers. They look for a little activity after the first of the year, however. Prices, which are nominal, are unchanged.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$7.50 to $8.50
Old iron rails	16.50 to 17.50
Relaying rails, 50 lb. and up	45.50 to 46.50
Rerolling steel rails	12.50 to 13.50
Heavy melting steel	12.50 to 13.50
Steel rails for melting	12.50 to 13.50
Car wheels	19.50 to 20.50
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.50
Cast borings	6.50 to 7.00
Steel turnings	4.00 to 4.50
Railroad cast	16.50 to 17.50
No. 1 machinery	20.50 to 21.50
Burnt scrap	8.50 to 9.50
Iron axles	23.00 to 23.50
Locomotive tires (smooth inside)	11.00 to 12.00
Pipes and flues	7.50 to 8.00
Malleable cast	10.50 to 11.00
Railroad tank and sheet	6.50 to 7.00

Cleveland

CLEVELAND, Dec. 28.

Iron Ore.—Further curtailment of mining operations in the Lake Superior district will probably be made at the first of the year. A few underground mines are now shut down and others have reduced their operations to single shifts. Most of the mining companies hold their annual meetings in January and some will take no steps toward reducing operations until the matter is discussed at these meetings. At the same time, many of the mining companies are expecting to take up the question of readjusting wages. So far, two mining companies have reduced wages, one 25 per cent and another 20 per cent, and it is probable that many others will decide to make some wage reductions. The Steel Corporation continues to move ore in fair volume from the lower lake docks, but shipments by independent consumers are very light.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—Sales during the week were limited to small lots of foundry iron, few orders being for more than car lots. All the business was placed at the $35 base price for No. 2 foundry, which is the usual quotation by the Lake and Valley furnaces. Some resale iron was also disposed of during the week at the same price, although resale foundry iron is still to be had at $2 to $3 per ton under the price asked by the furnaces. The only new inquiry of any size is from the American Radiator Co., which is in the market for 1500 tons of foundry iron for January shipment to its Detroit plant. Several consumers will need additional iron early in the year, but have advised producers that they will not place orders until January, as they hope to get lower prices at that time. Consequently, a little more activity is expected in the market early next month. Most of the Cleveland foundries, and some of the Michigan automobile plants operating foundries, shut down entirely last week for the holidays and some will not resume operations for two weeks or longer. Consequently, there have been additional suspensions of pig iron shipments and very little iron is being moved from the furnaces this week. Further curtailment is being made in furnace operations. The Hanna Furnace Co. has blown out its "B" stack in Detroit, both of its furnaces in that city now being out of blast,

the McKinney Steel Co. will blow out its Scottsdale furnace, Scottsdale, Pa., this week.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$34.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$33.96 to 35.96
Southern fdy., sil. 2.25 to 2.75	44.67 to 46.67
Ohio silvery, sil. 8 per cent	53.36 to 58.36
Standard low phos., Valley furnace	50.00

Coke.—The market continues very dull. A few sales of prompt shipment foundry coke are reported at $7.50 for standard Connellsville brands. A little inquiry is still coming out for foundry coke contracts for the first half, but ovens are declining to quote definite prices, several offering to take contracts based on the average monthly prices.

Bolts, Nuts and Rivets.—Another $5 per ton reduction has been made in rivet prices, effective Dec. 23, being the second reduction in a month. Previous to this reduction there had been some price shading. The new prices are 4.25c. Pittsburgh for structural rivets and 4.35c. for boiler rivets. Inquiry is very light. Some makers have reduced prices on stove bolts, but otherwise bolt prices are apparently well maintained. However, there is considerable price irregularity in cold punched nuts, which some makers are now quoting at the same prices as hot pressed nuts. Semi-finished hexagon nuts are also somewhat irregular in price. The bolt and nut market is very quiet.

Finished Iron and Steel.—Most manufacturing plants in this territory have shut down until after New Year's, and some will probably not resume operations next week. Steel plant operations did not change during the week and local plants that are not operating have made no plans for resuming. The market in finished lines is almost at a standstill, and practically no shipments are being released on suspended orders. Shipments of sheet bars are still held up by a number of mills. One Eastern mill that was not as prompt as other independent mills in reducing prices has now met the current market prices on all products except wire nails. Some recent rail inquiries have become active as a result of the reduction in rail prices by independent mills. These include 4000 tons for the Ann Arbor Railroad, 3000 tons for the Clover Leaf and 1000 tons for the Toledo Terminals Railway. The demand for plates is limited to small lots and some buyers are making efforts to secure concessions from regular prices, but apparently without success. In the building field, an inquiry has come out for 2500 tons of structural material for the Wade Park Manor Apartment building, Cleveland. Inquiry for reinforcing bars shows some improvement, but the demand is wholly for small lots. Mills are quoting hard steel bars at 2.35c., with the regular extras. The first inquiry for alloy steel in a lot of sufficient size to test the market that has come out for some time appeared during the week. This was for 290 tons of 3.50 per cent nickel steel, on which one mill quoted 6.75c., but another is understood to have taken the business at about 5.50c.

High Speed Steel.—The market is very dull and prices are weak. High speed steel is being freely offered at $1.25 per lb., and a round lot would probably bring out a $1 price.

Sheets.—A leading Detroit automobile company has advised the trade that it will come in the market in January for 1500 tons of sheets per month, but did not state for how extended a period it expected to buy. Most Detroit manufacturers are understood to still have good stocks of sheets, except full finished body sheets, for which some demand is expected early in the year. The sheet market continues very dull, with orders limited to small lots for early requirements. Sheet prices are generally being maintained, although one quotation is reported at a concession of $2 per ton from regular prices.

Cleveland warehouses quote steel bars at 3.30c. to 3.34c.; plates, 3.60c. to 3.64c. and structural material, 3.40c. to 3.44c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 5.75c. to 5.90c.; No. 28 galvanized, 7.25c.; No. 10 blue annealed, 5c.

Old Material.—The scrap market is almost at a standstill. Quotations have not changed during the week, but there is hardly enough activity to test the market. One local consumer is taking turnings for its blast furnaces, but no other consumers in this territory are accepting shipments. While dealers are not laying down a great deal of scrap, they are buying some small lots for yard stocks when these can be bought at prices well below the current quotations. Railroad malleable scrap on cars in Cleveland has sold as low as $16 per gross ton. No. 1 cast scrap is reported to have been offered at $21 by Detroit dealers.

Dealers quote delivered at consumers' yards in Cleveland and vicinity, as follows:

	Per Gross Ton
Heavy melting steel	$15.00 to $15.25
Steel rails, under 3 ft	18.00 to 18.25
Steel rails, rerolling	19.50 to 20.00
Iron rails	20.00 to 20.50
Iron car axles	35.00 to 36.00
Low phos. melting scrap	19.00 to 20.00
Cast borings	12.00 to 14.00
Machine shop turnings	9.50 to 10.50
Mixed borings and short turnings	12.00 to 14.00
Short turnings for blast furnaces	12.00 to 14.00
Compressed steel	9.75 to 10.25
Railroad wrought	17.00 to 17.50
Railroad malleable	20.00 to 21.00
Steel axle turnings	13.00 to 14.00
Light bundled sheet stampings	7.00 to 8.00
Drop forge flashings over 10 in	9.00 to 10.00
Drop forge flashings under 10 in	9.00 to 10.00
No. 1 cast	25.00 to 25.50
No. 1 busheling	11.00 to 12.00
Railroad grate bars	19.00 to 19.50
Stove plate	19.00 to 19.50
Cast iron car wheels	21.00 to 22.00
Pipes and flues	9.00 to 10.00

Philadelphia

PHILADELPHIA, Dec. 28.

In the last two weeks of the year there is seldom much business in iron and steel, but the final fortnight of 1920 may be recorded as the dullest period known to the Eastern iron and steel producing district since before the war. One independent interest with steel-making capacity of about 2,500,000 tons a year last week booked only 1000 tons in new orders. Some pig iron sellers do not take an order for days at a time. With these conditions there is nothing to indicate when the Eastern steel mills which are wholly shut down will be able to resume operations. One company, which expected to operate its plate mill on a single turn through the holiday period, has not been able to accumulate enough business to carry out that schedule.

However, there are some very slight signs that the mood of buyers is changing as the new year approaches. While orders have been almost negligible, there has been more inquiry, and in at least two instances contracts for sheets have been entered into for first quarter. Two or three weeks ago these buyers were not willing to consider any commitments either for prompt or forward shipment.

In the pig iron trade, a little more interest on the part of some foundrymen is noted. While formal inquiries for specific tonnages are not forthcoming, there is a little inquiry as to contract prices for first quarter, these prices to be used as the basis for figuring on contracts for castings. Several Eastern foundries which have been wholly or partly shut down report that their prospects for closing business look slightly better.

The trade has fixed Jan. 1 as the beginning of a slightly improved tone. Not much real activity is expected until February or March, but it is pointed out that a change in sentiment must come first, and then a revival of business will follow. Nowhere is there an expectation of rapid recovery. The impression very largely prevails that the resumption will be gradual.

Pig Iron.—With practically no business expected this week, the pig iron trade has turned its thoughts to the new year, with the hope that the change in the calendar may also bring about a change in sentiment that will be the forerunner of a revival in buying. That some pig iron producers do not look for any pronounced activity in the very near future is indicated by continued reports that several Eastern furnaces will blow out as soon as

scheduled shipments are completed. The Thomas Iron Co., with four furnaces, now has only one in blast, that at Hokendauqua, Pa. Eastern makers of foundry iron are generally holding for $35, furnace, for No. 2 plain and $36 or $36.25 for 2 X. One or two furnaces, however, have offered iron on the basis of $34, furnace. Resale iron, which seems to be disappearing in this district, is still to be had from Buffalo at quotations around $30, Buffalo. Adding the freight rate to eastern Pennsylvania, the delivered price is slightly under that quoted by Pennsylvania furnaces.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa. No. 2 plain, 1.75 to 2.25	$33.54 to $36.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	34.79 to 37.79
Virginia No. 2 plain, 1.75 to 2.25 sil.	41.75 to 45.74
Virginia No. 2X, 2.25 to 2.75 sil.	42.00 to 46.99
Basic deliv. Eastern Pa.	33.86
Gray forge	36.40
Standard low phos. (f.o.b. furnace)	45.00
Malleable	37.00 to 39.00
Copper bearing low phos. (f.o.b. furnace)	40.00

Coke.—High grade furnace coke is obtainable for prompt shipment at $5, Connellsville, while the same price has been quoted for January shipment. A forced sale of off-grade furnace coke was made at $4.25, Connellsville. Few furnaces are ready to make contracts, owing to uncertainty as to the extent of pig iron demand in first quarter.

Ferroalloys.—Agents of British producers of ferromanganese have been authorized to quote $110, seaboard, and it is likely that domestic producers will meet this price if any business should develop. Domestic producers will, however, first seek to obtain reinstatement of old contracts on which shipments were suspended. Spiegeleisen is not in demand, but is obtainable at $60, furnace. This price undoubtedly could be shaded at least $5 a ton.

Rails and Track Supplies.—The Pennsylvania Railroad has distributed orders for 200,000 tons of open hearth rails for 1921 shipment, following the decision of the independent makers to reduce their price from $57 to the level which has been quoted by the Steel Corporation, $47. The Steel Corporation will roll 100,000 tons, Bethlehem Steel Co. and Cambria Steel Co. each 45,000 tons, and Lackawanna Steel Co., 10,000 tons. In addition, the Pennsylvania Railroad is in the market for 400,000 to 1,600,000 tie plates (in weight from 2400 to 9600 tons), on which bids have been put in but no award announced. Some mills have quoted 3c. per lb., base.

Warehouse Business.—Local warehouses quote the following prices for steel products out of stock:

Soft steel bars and small shapes, 3.70c.; iron bars (except bands), 4.50c.; round edge iron, 4.80c.; round edge steel, iron finish, 1½ in. x ½ in., 4.00c.; round edge steel, planished, 4.75c.; tank steel plates, ¼-in. and heavier, 4.00c.; tank steel plates, 3/16-in., 4.40c.; blue annealed steel sheets, No. 10 gage, 5.15c.; light black steel sheets, No. 28 gage, 6.75c.; galvanized sheets, No. 28 gage, 8c.; square twisted and deformed steel bars, 3.90c.; structural shapes, 3.80c.; diamond pattern plates, 6.00c.; spring steel, 7.50c.; round cold-rolled steel, 5.35c.; squares and hexagons, cold-rolled steel, 5.85c.; steel hoops, No. 13 gage and lighter, 5.50c.; steel bands, No. 12 gage to 3/16-in. inclusive, 4.65c.; iron bands, 5.50c.; rails, 4.00c.; tool steel, 16.00c.; Norway iron, 12.00c.; toe steel, 6.00c.

Plates.—With most of the Eastern plate mills in idleness, the companies operating them see no definite prospect of resuming work. Some of the plate makers are busy denying reports that they have shaded 2.65c., Pittsburgh, on recent small transactions.

Structural Material.—Two building projects aggregating about 2500 tons of steel have been placed in Baltimore, but most of the current orders are small. Eastern mills quote 2.45c., Pittsburgh.

Bars.—There is little demand for steel bars. Makers quote 2.35c., Pittsburgh. On bar iron there are more frequent quotations around 3.25c., Pittsburgh, the nominal price of some makers being 3.50c.

Sheets.—Two contracts for blue annealed sheets for first quarter have been signed by consumers in this district at 3.55c., Pittsburgh. While the tonnages are small, the company which sold the sheets feels some encouragement as this is the first contract business which has been entered by independents since the prices of steel products began to weaken a few months ago. Practically all of the sheet mills are now quoting the same prices as the American Sheet & Tin Plate Co.

Old Material.—Dealers who have stocks of scrap are not willing to part with them at the prices which a few of the mills are offering. A large independent steel producer, whose price for heavy melting steel is $14.50, delivered, has, it is reported, received very little tonnage at this price. Dealers apparently believe that scrap prices have touched bottom and they are holding for the rise, which they feel is bound to come as soon as any improvement takes place in the demand for steel products. Most of the prices now quoted on various grades of scrap are within a few dollars of the lowest quotations of the past 20 years. The prices below are largely nominal, and represent the amounts which some mills in the East are willing to pay for delivery at their works. We quote:

No. 1 heavy melting steel	$14.50 to $15.00
Steel rails, rerolling	18.00 to 19.00
No. 1 low phos., heavy 0.04 and under	23.50 to 24.00
Car wheels	25.00 to 26.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	16.00 to 18.00
No. 1 forge fire	13.50 to 14.00
Bundled skeleton	13.50 to 14.00
No. 1 busheling	15.00 to 16.00
No. 2 busheling	11.00 to 12.00
Turnings (short shoveling grade for blast furnace use)	13.50 to 14.00
Mixed borings and turnings (for blast furnace use)	12.00 to 13.00
Machine-shop turnings (for rolling mill and steel works use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for rolling mills)	15.00 to 16.00
Cast borings (for chemical plants)	17.50 to 18.00
No. 1 cast	22.50 to 23.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	16.00 to 17.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 15.00
Iron car axles	30.00 to 31.00
Steel car axles	25.00 to 26.00

St. Louis

ST. LOUIS, Dec. 27.

Pig Iron.—Coupled with the dullness which has prevailed for some weeks was the approach of the trial balance and inventory period and in consequence nothing of any real interest appeared in the pig iron market. No buyers wanted the metal in any quantity and the furnace representatives were not in position to do anything but submit offers if any appeared. And none appeared. The resale iron continues to bear the market, but no price is attractive to melters who are either sufficiently supplied for any business that they may have or expect or are disinclined to commit themselves for any future deliveries in the present state of the market. No activity is expected until well after the first of the year and the general feeling is that it will be pretty close to the first of March before anything of consequence turns up.

Finished Iron and Steel.—In finished products there has been no change in the situation as to contract deliveries and the readjustment of existing contracts continues to be the chief problem of the day. Deferment of deliveries and changes of specifications as inventories are completed and future needs are determined are the order of the present. Movement out of warehouse continues fair and for stock out of warehouse we quote as follows:

Soft steel bars, 3.57½c.; iron bars, 3.57½c.; structural material, 3.67½c.; tank plates, 3.87½c.; No. 10 blue annealed sheets, 4.77½c.; No. 28 black sheets, cold-rolled, one pass, 6.10c.; No. 28 galvanized sheets, black sheet gage, 7.45c.

Coke.—Naturally, in concurrence with the situation in pig iron there has been no desire to make commitments for coke for future delivery and there has been no need developing for immediate delivery coke either 72-hour or 48-hour grades. By-product coke is in the same position as bee-hive coke and in consequence there are on prices worthy of quotation at present.

Old Material.—In the scrap market there has been no trading and dealers are not doing anything, even among themselves, while there is no disposition to buy anything even at attractive prices to lay down in the yards. The consuming interests are not in the market at any price and the burning of the East Side plant of the Helmbacher rolling mills has removed a customer entirely from the field for a considerable period of time. No railroad lists appeared during the week and none are expected now until after Jan. 1.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

	Per Gross Ton	
Old iron rails	$22.00 to	$22.50
Old steel rails, rerolling	17.00 to	17.50
Old steel rails, less than 3 ft	16.00 to	16.50
Relaying rails, standard section, subject to inspection	35.00 to	40.00
Old car wheels	30.00 to	30.50
No. 1 railroad heavy melting steel scrap	14.00 to	14.50
Heavy shoveling steel	13.00 to	13.50
Ordinary shoveling steel	12.50 to	13.00
Frogs, switches and guards cut apart	14.00 to	14.50

	Per Net Ton	
Ordinary bundled sheet	8.00 to	8.50
Heavy axle and tire turnings	8.00 to	8.50
Iron angle bars	22.00 to	22.50
Steel angle bars	14.00 to	14.50
Iron car axles	30.00 to	30.50
Steel car axles	20.00 to	20.50
Wrought arch bars and transoms	22.00 to	22.50
No. 1 railroad wrought	16.50 to	17.00
No. 2 railroad wrought	16.00 to	16.50
Railroad springs	13.50 to	14.00
Steel couplers and knuckles	15.50 to	16.00
Locomotive tires, 42 inches and over, smooth inside	12.50 to	13.00
No. 1 dealers' forge	11.00 to	11.50
Cast iron borings	8.00 to	8.50
No. 1 busheling	15.00 to	15.50
No. 1 boilers, cut to sheets and rings	9.00 to	9.50
No. 1 railroad cast scrap	18.50 to	19.00
Stove plate and light cast scrap	16.00 to	16.50
Railroad malleable	12.75 to	13.25
Agricultural malleable	12.75 to	13.25
Pipes and flues	10.50 to	11.00
Railroad sheet and tank scrap	8.00 to	8.50
Railroad grate bars	13.00 to	13.50
Machine shop turnings	5.00 to	5.50
Country mixed scrap	9.00 to	9.50
Uncut railroad mixed scrap	9.50 to	10.00
Horseshoes	16.50 to	17.00
Railroad brake shoes	13.00 to	13.50

SECRETARY BAKER'S POSITION

Government Arsenal Cannot Be a Closed Union Shop

In his address at the convention of the National Founders' Association, in New York, Col. T. C. Dickson, commanding officer, Watertown Arsenal, Watertown, Mass., spoke on "Industrial Relations in the Ordnance Department, United States Army." He described the shop organization plans at the Watervliet and Rock Island arsenals, which are the only manufacturing ordnance establishments that have any organized system of employees. At the Watervliet Arsenal a shop committee, the three members of which are elected by popular vote of all employees, represents the latter in the presentation to the commanding officer of all questions relating to conditions of employment, wages, etc.

"A little over a year ago," said Colonel Dickson, "in obedience to the policy of the War Department, a plan of employees' representation was proposed at Frankford and Watertown arsenals, but the employees of both opposed a works council, possibly in obedience to the resolution of the American Federation of Labor against any form of works organization.

"The reduction in force made at arsenals on June 30, 1920, resulted in the president and secretary of the machinists union at Rock Island Arsenal and the president of the machinists union at Frankford Arsenal being discharged on account of low efficiency. The American Federation of Labor protested vigorously against these discharges to the Secretary of War. After a detailed investigation the Secretary sustained the discharges and the following quotation from his letter to the Chief of Ordnance, dated Sept. 1, 1920, giving his decision will interest you:

Secretary Baker's Letter

"'No Government arsenal can be a closed union shop. The Government of the United States is the creature and representative of all the people of the United States. Its public institutions are for the use of the whole people; its operatives and employees must be freely drawn from those who are qualified by skill and character without reference to their membership in unofficial trade organizations, membership in which is voluntary, so far as the Government is concerned, and should not be made compulsory either by law or by exclusion from opportunity, which would have the effect of law. The workers in a Government arsenal are therefore sometimes union men and sometimes not. Their relationship to the Government is independent of that fact. No representative, therefore, of a union can speak as the representative of all the employees even of a particular trade in the Government service, and it is of the essence of the relationship between the Government as employer and the citizen as employee that an agency should be created as democratic as the opportunities for employment itself, whereby all the workers can consider their interests and co-operate with the management in bringing about conditions satisfactory to the employee and efficient to the Government for the performance of the work in hand. The works organization at Rock Island Arsenal does this. If that works organization needs change, the workers and the management in their present spirit will be able to bring about the change. Such employees at these arsenals as are members of unions have in the works organization all the opportunity which their skill as workers and their intelligence as men could ask. They are freely admitted to membership in the works organization, they participate in its discussions and its decisions, and if any principle which they wish to urge commends itself to the whole body of workers its expression through the agency of the works organization comes from the entire body of the Government's employees. Such principles which they desire to urge which are not so accepted may be regarded as immature in the sense that the task of those who have attained these views is the conversion of their associates until they become accepted beliefs.

"'I make these observations because I believe in the works organization and trust that whatever opposition or distrust has grown up about it will disappear. I see no necessary antagonism between it and the trades unions. It is not intended as a substitute for the trades unions and its operation at Rock Island Arsenal, so far as my inquiries have been able to develop the facts, have not been hostile to the unions.'

"There is good reason for believing that a majority of the employees of each manufacturing ordnance establishment are members of labor unions. Persistent efforts have been made by committees of the various unions to secure official recognition of the unions and also to limit the commanding officers to dealing with employees other than through labor union committees. At some manufacturing ordnance establishments, representatives of the unions of the various trades form a metal trades association, which co-ordinates the activities of the various unions and has endeavored to be the sole channel of communication between employees and the Commanding Officer.

"When a commanding officer receives a committee it is distinctly understood that the committee represents the employees of the arsenal and not any union or collection of unions. Sometimes the Commanding Officer sends for a number of other employees and hears what they have to say on the question under consideration as well as the members of the committee. Sometimes the Commanding Officer consults the three persons standing at the head of the efficiency list in each grade of each trade; whatever may be the views and advice a commanding officer obtains, his decisions must be in accordance with law, regulation and orders, also in accordance with the policy of the administration, and above all for the best interests of the United States Government."

The Grand Rapids Malleable Co., Fuller Junction, Mich., will build a coal pulverizing plant. The cost will be about $100,000.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	0.695
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.78
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.33	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.78		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e. New York, Philadelphia and Baltimore), to Pacific Coast ports of call on all steamship lines via the Panama Canal are as follows: Pig iron, 55c.; ship plates 70c., ingots and muck bar, structural steel, tin plate, sheets, all wire products, 75c.; pipe not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per inch, or fraction thereof additional.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.45c.

Wire Products

Wire nails, $3.25 to $3.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 to $2 and shorter than 1 in., $2 to $2.50. Bright Bessemer and basic wire, $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25 as quoted by the American Steel & Wire Co., and No. 8 and heavier, $3.25, the price of the independent makers; galvanized wire, $3.95; galvanized barbed wire, $4.10 to $4.35; galvanized fence staples, $4.20 to $4.45; painted barbed wire, $3.40 to $4.10; polished fence staples, $3.50 to $4; cement-coated nails, per count keg, $2.85 to $3.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 to 60½ per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets....$4.25
Large boiler rivets....4.35
Small rivets....60 per cent off list
Small machine bolts, rolled threads....60 per cent off list
Same sizes in cut threads....50 and 10 per cent off list
Longer and larger sizes of machine bolts
45 and 5 per cent off list
Carriage bolts, ⅝-in. x 6-in.:
Smaller and shorter, rolled threads
40, 10 and 5 per cent off list
Cut threads....40 and 5 per cent off list
Longer and larger sizes....40 and 5 per cent off list
Lag bolts....50 per cent off list
Plow bolts Nos. 1, 2 and 3 head....50 and 5 per cent off list
Other style heads....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:
Smaller and shorter....40, 10 and 5 per cent off list
Longer and larger sizes....40 per cent off list
Cold punched and hot pressed sq. or hex. blank nuts
$2.25 off list
Tapped nuts....$1.75 off list
C. p. c. & t. sq. or hex. nuts, blank....list
C. p. c. & t. sq. or hex. nuts, tapped....list plus $1.00
Semi-finished hex. nuts, U. S. S. and S. A. E.:
¼ to 9/16-in. inclusive, 70 and 10 to 75 and 10 per cent off list
⅝ to 1 in. inclusive....65 to 70 per cent off list
Stove bolts in packages....75 and 10 per cent off list
Stove bolts in bulk....75 and 2½ per cent off list
Tire bolts....50 per cent off list
Track bolts....5.50c. base
Sq. and hex. head cap screws, both rolled and cut threads:
Milled....50 per cent off list
Upset....55 and 10 per cent off list
Set screws:
Milled....55 per cent off list
Upset....60 and 5 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $57; screw stock rods, $62; rivet and bolt rods and other rods of that character, $57; high carbon rods, $68 to $75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.65 per 100 lb in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $4.50; 5/16-in., $5.25. Boat and barge spikes, $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $3.60 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Common bar iron, 3.63c. to 4c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	47 to 50½	20½ to 24	⅜	15½ to 16½	+10½ to 11½
½	51 to 54½	36½ to 40	½	19½ to 20½	1½ to 2½
¾ to 3	54 to 57½	41½ to 44	¾ to 1½	24½ to 25½	8½ to 9½

Lap Weld

2	47 to 50½	34½ to 38	2	20½ to 21	6½ to 7
2½ to 6	50 to 53½	37½ to 41	2½ to 6	22½ to 23	9½ to 10
7 to 12	47 to 50½	33½ to 37	7 to 12	19½ to 20	6½ to 7
13 and 14	37½ to 41				
15	35 to 38½				

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43 to 46½	25½ to 29	¼	+16 to 17	+40 to 50
½	48 to 51½	35½ to 39	⅜	13½ to 14½	+2½ to 3½
¾ to 1½	52 to 55½	39½ to 43	½	18½ to 19½	5½ to 6½
2 to 3	53 to 56½	40½ to 44	¾ to 1½	24½ to 25½	9½ to 10½

Lap Weld, extra strong, plain ends

2	45 to 48½	33½ to 37	2	21½ to 22½	8½ to 9
2½ to 4	48 to 51½	36½ to 40	2½ to 4	23½ to 24	11½ to 12
4½ to 6	47 to 50½	35½ to 39	4½ to 6	22½ to 23	10½ to 11
7 to 8	43 to 46½	29½ to 33	7 to 8	14½ to 15	2½ to 3
9 to 12	38 to 41½	24½ to 28	9 to 12	9½ to 10	+2 to 2½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel	*Charcoal Iron*	
1¾ to 1⅞ in.	+ 7 to — 19½	1½ to 1¾ in.	+ 23	
2 in.	+ 2 to — 19½	1⅝ to 1⅞ in.	+ 20	
2¼ to 2½ in.	3 to 30½	2 in.	+ 10	to 15
2¾ to 3¼ in.	11 to 30½	2¼ in.	+ 10	to 12
3½ to 4½ in.	20 to 40½	2½ in.	+ 1	to 10
		2¾ to 3¼ in.	— 1½	to + 3
		3½ to 4½ in.	— 8	to list

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

	Cents Per Lb.		Cents Per Lb.
No. 8 and heavier	3.45	Nos. 13 and 14	3.65
Nos. 9 and 10 (base)	3.55	Nos. 15 and 16	3.75
Nos. 11 and 12	3.60		

Box Annealed, One Pass Cold Rolled

	Cents Per Lb.		Cents Per Lb.
Nos. 17 to 21	4.15	No. 28 (base)	4.35
Nos. 22 to 24	4.20	No. 29	4.45
Nos. 25 and 26	4.25	No. 30	4.55
No. 27	4.30		

Galvanized Black Sheet Gage

	Cents Per Lb.		Cents Per Lb.
Nos. 10 and 11	4.70	Nos. 25 and 26	5.40
Nos. 12 to 14	4.80	No. 27	5.55
Nos. 15 and 16	4.95	No. 28 (base)	5.70
Nos. 17 to 21	5.10	No. 29	5.95
Nos. 22 to 24	5.25	No. 30	6.20

Tin-Mill Black Plate

	Cents Per Lb.		Cents Per Lb.
Nos. 15 and 16	4.15	No. 28 (base)	4.35
Nos. 17 to 21	4.20	No. 29	4.40
Nos. 22 to 24	4.25	No. 30	4.40
Nos. 25 to 27	4.30	Nos. 30½ and 31	4.45

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Dec.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
22	13.75	13.50	33.00	4.50	4.50	5.75	5.75
23	13.75	13.37½	32.75	4.50	4.50	5.50	5.70
24	13.75	13.37½	33.00	4.50	4.50	5.50	5.60
27	13.75	13.25	33.00	4.50	4.50	5.50	5.50
28	13.75	13.25	33.50	4.50	4.50	5.60	5.60

NEW YORK, Dec. 28.

The year closes with the markets practically devoid of business and prices at the low levels of the year. They are in fact practically down to pre-war values. The copper market is lifeless and the price tendency easy. Quotations for tin are nominal and there is no buying by consumers or dealers. Business in lead is very light and values are a little lower. Zinc has further declined, due to the softness of the London market. Antimony is lower.

New York

Copper.—The year draws to a close with the market in an extremely lifeless condition, the only buying consisting of small amounts for prompt delivery caused in many cases by a necessity for cash on the part of the seller. Electrolytic copper is quoted, largely nominal, at 13.25c. to 13.50c., New York, the former price applying to prompt delivery and the latter to first quarter. Some of the large producers are not quoting, while others hold to 14c. Lake copper is nominal at 13.75c., New York. It is generally conceded that production has been curtailed considerably, but an estimate of the amount is difficult to secure as well as to make.

Tin.—The market has been practically devoid of transactions, with the exception of 50 tons of Straits tin for January shipment, sold on the New York Metal Exchange, Dec. 23, at 32.75c. Consumers and dealers as well as speculators have withdrawn from the market, which is so stagnant that it is difficult to determine values. Quotations for spot Straits, New York, are nominal with that for to-day at 33.50c. There are a few who expect an active market early in 1921, but this cannot come unless there is a decided improvement in the buying by consumers. The London market is again lower, with spot standard quoted to-day at £200 per ton, future standard at £205 15d. and spot Straits at £205. Arrivals thus far this month have been 2420 tons, with the quantity afloat 1890 tons.

Lead.—The market has been generally quiet. There has been a little more interest in small lots by consumers, consisting of from one to three carloads, and business has been done as low as 4.50c., both New York and St. Louis. The fact that the London market is at a low level, making possible importations into this country, keeps the New York quotation on the same basis as in the West. It develops that some sellers did considerable business on the decline, and are not eager now for new business, while others do not care to compete at present prices. The result is that there are fewer sellers now than a week ago and the tone of the market is therefore steadier.

Zinc.—A further recent weakness in the London market, where zinc has gone to below £24 per ton, has been the controlling factor here. Yesterday was the low point on this movement, when prime Western was offered and sold at 5.50c., St. Louis, with imported metal offered at 5.40c., seaboard. It is estimated that about 2000 tons have been sold for export, due to arrive here in January and February. There is very little demand and sales are confined to small lots for prompt delivery. Prime Western for early delivery is quoted to-day at 5.60c. to 5.65c., St. Louis, due to an advance of over £1 per ton in the London market. The New York quotation is 6c. to 6.10c. for domestic metal, with the imported metal available at 5.50c. to 5.60c., seaboard.

Antimony.—Wholesale lots for early delivery are quoted at 5.25c., New York, duty paid.

Aluminum.—The leading interest is quoting 15-ton lots of virgin metal, 98 to 99 per cent pure, for early delivery, at 28.30c., f.o.b. producer's plant, while in the outside market the same grade of metal is quoted at 22c. to 23c.

Old Metals.—The market is very sluggish and business is practically at a standstill. Everybody seems to be waiting to see what the turn of the year has in store. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.25
Copper, light and bottoms	10.25
Brass heavy	9.50
Brass, light	6.75
Heavy machine composition	12.50
No. 1 yellow rod brass turnings	7.50
No. 1 red brass or composition turnings	10.50
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.75

Chicago

Dec. 28.—Buying of all the metals has practically ceased. Heretofore a moderate amount of inquiry has developed every week, little of course resulting in orders, but the market is now devoid even of inquiries. Tin, spelter and lead have declined, but the downward tendency of prices is less marked than earlier in the month. Of the old metals only pewter has declined. We quote Lake copper at 14.50c. in carload lots; tin, 35c. to 36c.; lead, 4.70c.; spelter, 5.75c.; antimony, 7c. to 7.50c. On old metal we quote copper wires, crucible shapes, 9c.; copper clips, 9c.; copper bottoms, 7.50c.; red brass, 9c.; yellow brass, 6c.; lead pipe, 3c.; zinc, 3c.; pewter, No. 1, 16.50c.; tinfoil, 20c.; block tin, 25c.; all these being buying prices for less than carload lots.

St. Louis

Dec. 27.—The non-ferrous markets have been very quiet, with the close for the week as follows: Lead, 4.50c.; spelter, 5c.; less than car lots, lead, 5c.; spelter, 5.50c.; tin, 39c.; copper, 15.50c.; antimony, 9.50c. In the Joplin district ores were very quiet with lead, basis 80 per cent, selling in small quantities, at $47.50 per ton; calamine, basis 40 per cent, $25 per ton and zinc blende, basis 60 per cent, $37.50 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 4.50c.; heavy yellow brass, 6.50c.; heavy red brass, 10c.; heavy copper and copper wire, 10c.; light, copper, 9c.; pewter, 18c.; tinfoil, 25c.; lead, 4c.; zinc, 5c.; tea lead, 3c.; aluminum, 12c.

Instead of sending out the usual calendar holiday greetings the Pollak Steel Co., Cincinnati, has been remembering its friends with fountain pens, cleverly designed to represent a Pollak railroad axle. The pen point is 14 kt. gold and is tipped with iridium. It is self filling.

It is announced that the Canadian plants of the General Motors Corporation will resume operations about Jan. 1. The Canadian Products Co., General Motors subsidiary in Walkerville, Ont., employs 1500 men.

The New York Central Railroad Co., Albany, N. Y., has closed its car shops at West Albany, effective Dec. 24, for an indefinite period. About 1000 men are affected.

The Buffalo Steel Co., Tonawanda, N. Y., resumed operations at its plant with a day force during Christmas week. The plant was closed for an indefinite period early in December.

Breast drills with three jaw chucks are announced by the Consolidated Tool Works, 261 Broadway, New York. Absence of springs is emphasized as a feature.

PERSONAL

Following the death of John Illingworth, president John Illingworth Steel Co., Frankford, Philadelphia, a meeting of the directors was held Dec. 20, at which the following officers were elected: Clarence Illingworth, president; C. P. Soden, vice-president and treasurer; William H. Illingworth, secretary.

George A. Paff, for the past three years and a half general superintendent Monessen Works, Page Steel & Wire Co., and formerly of the Jones & Laughlin Steel Co., has tendered his resignation to accept a position with the Whittaker-Glessner branch of the Wheeling Steel Corporation, effective Jan. 1.

Colonel John W. Roelker, after 30 years in the service of B. F. Avery & Sons, Louisville, Ky., agricultural implements, part of the time as purchasing agent, and for the past year contracting agent, has retired at the age of 72. He will reside at 407 Glenwood Avenue, Joliet, Ill.

Harry C. Holloway, general manager Maintenance Equipment Co., manufacturer of labor saving track devices, Railway Exchange Building, Chicago, has been elected vice-president.

I. H. Billiar has resigned as works engineer of the Duquesne Steel Foundry Co., Coraopolis, Pa., to accept a position with the Steel & Tube Co. of America as assistant engineer at the Mayville plant, Mayville, Wis.

The Detroit Motor Parts Co. has announced the appointment of W. E. Nutting as general manager, to replace R. B. Merrill, resigned.

The Calumet Truck Body Co., Calumet, Mich., recently organized, has elected William H. Thilman, president.

Fred C. Moore, general manager Vermilion Malleable Iron Co., Hoopeston, Ill., has been elected vice-president.

E. B. Hill, formerly treasurer Bethlehem Steel Co., and of the Bethlehem Shipbuilding Corporation, Ltd., has been made vice-president of the latter and will be in charge of operations at the Fore River Works, Quincy, Mass. Mr. Hill succeeds J. W. Powell who is to take up special work for the corporation.

Frank W. Lowry, in the auditing department, National Tube Co. for a number of years, has resigned to accept the position of general manager of the Ellwood Foundry & Machine Shop, Ellwood City, Pa.

G. L. Stansbury has resigned as auditor of the Republic Rubber Corporation, Youngstown, Ohio, where he has been for the last twelve years, to become vice-president and treasurer of the Phœnix Tube Co., Warren, Ohio.

Joseph Vallely has been appointed chief clerk in the sales office of the Republic Iron & Steel Co., Chicago, effective Jan. 1, succeeding R. L. Stofer, who has resigned to enter the sales organization of the Paterson-Leitch Co., Cleveland. Mr. Vallely has been in the accounting department of the American Steel Foundries at Chicago and was formerly with the Republic Iron & Steel Co. at Chicago and Pittsburgh.

B. C. Ames, B. C. Ames Co., Waltham, Mass., bench lathes, is in California for the winter.

At a meeting of the board of directors of the P. & M. Co., rail anti-creepers, Chicago, on Dec. 21, Fred N. Baylies, general sales agent, was elected vice-president.

W. R. H. Atcheson, superintendent blast furnaces Inland Steel Co., Indiana Harbor, Ind., has been appointed assistant general superintendent of the works. H. W. Linhardt has been appointed superintendent of blast furnaces.

Maxwell Spiro has succeeded C. A. Reagan as New York district manager of Briggs & Turivas, iron and steel scrap, 2 Rector Street, New York, Mr. Reagan having been transferred to Chicago. Mr. Spiro was formerly civil engineer, assistant to the chief engineer Baldwin Locomotive Works at Burnham, Pa.

D. E. Sawyer, general sales manager Pollak Steel Co., 120 Broadway, New York, was recently rated by the United States Golf Association as one of the best 10 players in the country. He recently won the Metropolitan golf tournament.

Frank M. Welsh, formerly with Knapp & Baxter, exporters, New York, and later in charge of the New York office, at 30 Church Street, of the Iron Trade Products Corporation, Pittsburgh, will open after Jan. 1 a Pittsburgh district office for the Detroit Graphite Co., New York, manufacturer of natural graphite paint, which is sold direct to consumers.

The Chicago Pneumatic Tool Co. announces the resignation of H. L. Dean, formerly manager of the compressor and engine sales division; also the appointment of J. F. Huvane as eastern manager of compressor and engine sales, with headquarters at 6 East Forty-fourth Street, New York, and of G. C. VandenBoom as western manager of compressor and engine sales, with headquarters at 300 North Michigan Boulevard, Chicago.

Effective Jan. 1, Franklin Wharton, who has been in the general sales office of the Oliver Iron & Steel Co., Pittsburgh, takes charge of the Pacific Coast district office of the company at 505 Monadnock Building, San Francisco.

C. N. Draper of B. K. Morton & Co., Sheffield, England, has been appointed sole American representative of the company, in charge of sales of "Rayo" high speed steel. Mr. Draper is making his headquarters at Brown Brothers & Co., bankers, 59 Wall Street, New York.

OBITUARY

WILLIAM A. BOLL, treasurer Boll Mfg. Co., Harrisburg, Pa., manufacturer of dies and similar goods, died at his home on Dec. 18 after a brief illness. He was 61 years old.

THOMAS T. BOOTH, president Standard Foundry Co. and a director Crompton & Knowles Loom Works, Worcester, Mass., died Dec. 20 in that city, aged 63. Mr. Booth suffered from diabetes several years. In partnership with his son-in-law, Halsey R. Philbrick, he owned the Philbrick-Booth Co., Hartford, Conn., iron foundries.

GEORGE W. CURTIS, former production manager Detroit Steel Products Co., died Dec. 12 at his home in Detroit, He was born in England, 47 years ago.

GEORGE GRAY, former president Mianus Motor Works, Stamford, Conn., died Dec. 22 on his farm at Colchester, Conn.

WILLIAM T. BECKER, New England sales manager Acme Road Machinery Co., Frankfort, N. Y., died recently.

Greiling Brothers, general contractors, Green Bay, Wis., are lowest bidders at $339,000 for the construction of a new Strauss type bascule bridge across the Root River at State Street, that city. Other bidders were: Edward E. Gillen Co., Milwaukee, $355,850; Northwestern Bridge & Iron Co., Milwaukee, $395,000; Great Lakes Dredge & Dock Co., Milwaukee, $516,000; A. Green Construction Co., Green Bay, Wis., $381,500. About 650 tons of structural steel will be required.

The Automatic Products Corporaton has succeeded the Tock Screw Machine Products Corporation, Long Island City, New York, taking over its assets and assuming its liabilities. There will be no change in the personnel of the officers or employees, and the business of the company will be carried on as heretofore.

The Singer Mfg. Co., Elizabethport, N. J., manufacturer of sewing machines and parts, has posted notices announcing the reopening of its plant on Jan. 6. The works were recently closed down for inventory and on account of market conditions. The company has been giving employment to over 8000 operatives.

SHRINKAGE AND SOLIDITY

Pouring Temperature as Affecting Non-Ferrous Castings—Fundamentals Discussed

Pouring temperatures as affecting casting shrinkage and solidity were discussed by R. R. Clarke, Nolte Brass Co., Springfield, Ohio, in a paper presented before the American Foundrymen's Association, Columbus, Ohio, Oct. 4 to 8. The paper was concerned chiefly with those castings in which bulk is heavy or variable or the ratio of volume to surface high, such as a 6-in. cube, a 5-in. pin brass 12 in. long, a valve body, flanged bushing, etc. The paper follows:

In using the word shrinkage we observe the sense of drawing, sinking or receding of metal at its highest or heaviest casting vicinities or between the variables of bulk where the shrinkage is unusually strong and exceedingly local.

Briefly the propositions at hand are: Shrinkage decreases as temperature rises; cleanliness and compactness advance with temperature, a closely defined and dangerous limit intercepts a rising temperature, marking the activity of gases and oxides and making for a most distressing condition in the castings; hot pouring necessitates molding with that end in view.

Fluidity Is Factor in Shrinkage

That shrinkage should decrease with temperature is an apparent contradiction, since expansion's law is to advance with temperature and measure a corresponding contraction in return to normal. No doubt the explanation rests in part at least on the greater fluidity enabling the metal to generate and transmit higher gate pressure, run the mold more searchingly and establish and maintain better communication between its parts.

The primary advantage of hot pouring is a clean, solid, unshrunken casting realized through a comparatively small gate easily removed. Instances could be cited where a change of gating practice and pouring temperature reduced the gate metal from 100 lb. to 20 lb. and cut down cleaning time and expense, melting loss, etc., correspondingly.

Additional advantages are the suppression of the hair line fracture, of gate pin holes, and the nullified effect of molding inconsistence to which cold metal is so peculiarly sensitive. Against a hard cope or damp core cold metal immediately rebels and solidifies, preserving the effect. Hot metal contends against the condition and often prolongs fluidity beyond the activity of cause.

The hair line fracture is a modified form of recession deriving from unequal contraction and intensifying with erratic molding such as wet sand, hard ramming, sparse venting, etc. By our experience it seldom seriously attends hot pouring but to greater or less degree always emphasizes cold pouring.

Requirements of Hot Metal Mold

A hot metal mold requires sand rather dry, rammed hard, faced well, vented freely and clamped or weighted securely in pouring. Similar precautions should be taken against the burning in of cores.

Experience lends to the belief that within certain limitations there is a suggestion of identity between the running capacity of metal in light thin castings and its power to resist shrinkage in bulky castings or variables between volume, that the ability of metal at proper temperature to run a thin gate and light casting is at least an indication of its function at the same temperature to transcourse the same gate to a clean, solid, unshrunken bulky casting. Both experience and experiment contribute to this inference under certain limitations as previously stated.

Hot pouring and solid castings apply more directly to the more common copper-tin, copper-tin-lead and copper-tin-lead-zinc alloys as 90 copper 10 tin, 88 copper 10 tin 2 zinc, 80 copper 10 tin 10 lead, 85 copper 3 tin 5 lead 3 zinc, and weakens in those metals and combinations observing an unusually high contractive tendency. Among these are pure copper, monel metal, yellow brass, manganese bronze, aluminum bronze, tobin bronze, muntz metal and other high zinc mixes. A further striking feature of shrinkage is that new metals or combinations on first melting usually advance shrinkage beyond that of a succeeding manipulation. Metal melted and pigged and then remelted and cast or that representing part new, part remelt will usually express shrinkage less than all new metal cast on first melting.

High pouring temperatures are critical chiefly because of extreme oxidation and the occlusion and expulsion of gases resulting in porosity. They therefore call for extreme caution and high-powered judgment. Beyond the danger line metal has sometimes a curdled-milk appearance, sometimes a dull-colored surface crust and sometimes a wicked looking exhibition of the varying colors arising from the different constituents such as tin, lead, etc. Another phenomenon of transgression is a spattering or crackling sound as that of boiling slag. Metal at such temperature will often appear mushy and cold and consequently deceiving as to its temperature when judged solely on its appearance of fluidity. These are dangers we might state we have encountered mostly in air and oil melting. On the other hand, cold pouring by virtue of low fluidity weakens cohesion, strengthens metals' power to hold and include its dirt and dross and denies that gate pressure deriving from the hydrostatic principles.

Many actual cases could be cited in proof of these arguments, among them the casting of heavy valve bodies, trolley wheels, heavy pin brasses, large bushings, heavy gear wheels, brazing flanges, pressure castings and many others.

Creditors of Cromwell Steel Co. Meet

At a meeting of the general unsecured creditors of the Cromwell Steel Co., Cleveland, Dec. 13, a committee was appointed to look after the interests of these creditors. The committee in a letter to creditors states that on Nov. 30 the company had assets amounting to $5,909,308.64, with nothing included for good will. The liabilities on Dec. 8 were as follows: Accounts payable, $532,044.75; notes payable, $649,886.23; taxes, payrolls, etc., $69,604.17.

There are also plending suits relating to scrap iron (contested by the company) amounting to $146,500; demand on electric contract $4,500, and possible shrinkage in Government steel amounting to $9,200, making a possible total general indebtedness of $1,411,735.

The committee is endeavoring to get all general unsecured creditors to consent to an extension of time and to procure from the bondholders an agreement to cooperate with the creditors to give the company an opportunity to work itself out of its present difficulties so that creditors and bondholders may be paid in full. The committee declares that it is certain that if the company is not given an extension of time, the appointment of a receiver will be absolutely necessary and that a receiver could not hope to realize at a forced sale at this time any price approaching the actual value of the assets of the company. The creditors are therefore urged to sign an agreement which has been submitted to them.

The company's plant is located at Lorain, Ohio, and it has a capacity of 200,000 tons of ingots and 150,000 tons of rolled products.

A "Business Directory of Nagoya" has been published by the Chamber of Commerce of Nagoya, Japan. The book, which contains 100 pages bound with a heavily embossed paper cover, contains a description of the city, its industries and importance as a port of entry for foreign goods brought into Japan. Among the heavy imports from abroad are iron, steel, machinery and tools. The book also contains a complete directory of the manufacturers, importers and exporters of the city.

Wales Concerned About American Tin Plate Exports

Welsh Investigation of the Large Hold on World Trade Which the United States Seems to Have Obtained

A HIGHLY interesting statement comparing the respective share of Wales and the United States in the world's export markets for tin plate, terne plate and taggers tin has been shown to THE IRON AGE. It appears to have been prepared at the instance of the South Wales Tin Plate Propaganda Agency.

The periods taken for comparison were the 12 months immediately preceding the outbreak of war (July 1913-June 1914), and the calendar year 1919: figures were given also for the first half of 1920. It was pointed out that as between the 12 months preceding the war, and the year 1919, the percentages of the export trade of the two countries have undergone a radical alteration and that the 1919 proportions appear to be the more permanent in the light of the trade currents of 1920. It was shown that Wales, based upon its share of the trade in 1913-1914, lost 161,470 tons of her exports to United States mills in 1919. The basis of computation is set out in the table.

Period	Total (Gross Tons)	Wales	U.S.A.	Per Cent of Total Wales	Per Cent of Total U.S.A.
Twelve months ended June 30, 1914	542,439	495,162	47,277	91.3	8.7
Twelve months ended Dec., 1919	493,983	289,462	204,521	58.6	41.4
Six months Jan.-June, 1920	303,253	180,886	122,357	59.6	40.4

If Wales had secured the same percentage of exports in 1919 as it did in the year ended June 30, 1914, it would have exported 450,900 tons. Against the actual exports of 289,462 tons, it will be seen that Wales feels that it has lost 161,400 tons. By the same figuring, the United States should have apparently exported only 43,000 tons instead of 204,521 tons.

Where Welsh exports *increased* to particular countries, the improvement arose from the expansion of those particular markets, and was not in any case at the expense of the United States. At the same time Wales succeeded in getting the bulk of the increased business, namely 36,287 tons, coming from these special markets (France, Spain, Portugal, Australia, Egypt and the Dutch Indies) against 6087 tons to America.

In markets to which Welsh exports *decreased*, the falling off was 241,987 tons, but the total reduction in the exports of Wales and America to these markets was only 162,165 tons. In addition to the falling off in Welsh exports to these countries some of these markets actually broadened, and to the extent of 70,046 tons, but Wales failed to secure one single ton of that expansion, the whole of it going to America. Since the American percentage of the world's export trade in tin plates, etc., in 1913-14 was 8.7 per cent, America with the maintenance of pre-war proportions should have lost 8.7 per cent of the total decrease in exports to these markets. Instead of this, however, Wales bore the whole loss, while to the extent of 8.7 per cent of 162,165 tons, namely 14,100 tons, (this being the total loss in Welsh-American exports to this group of markets) America was the gainer. Again, instead of America's taking the whole of the increase in these markets, Wales should have got 91.3 per cent or 63,950 tons.

Markets Wales Failed to Hold

In the export markets in which the United States *increased* their share of the business, these markets showed a net expansion of 8330 tons, but America actually supplied 157,566 tons more, and Wales 149,236 tons less. Wales during 1919 took a fair share of the increased purchases into European or Empire markets, but elsewhere not only failed to participate, but fell heavily, particularly in Japan, China and South America. It is pointed out as significant that in practically every market whose takings decreased, America not only did not suffer in 1919, but actually increased its exports by 27,979 tons.

In markets to which America exported *fewer* tin plates in 1919 than in 1913-14, the total falling off was 34,756 tons, but the American share of the loss was only 322 tons while that of Wales was 34,434 tons.

It appears also that the demand from the Near East declined in 1919, while that from the Far East increased, and that America in 1919 though getting more of the Near East than in 1913-14, still supplied only one-eighth of that market. The increase in the American exports all went to the Far East, but Wales still holds one-fourth of the business there, the exceptions being Australia and New Zealand where Wales is well protected by tariffs. Before the war Japan bought practically exclusively from Wales, but in 1919 purchased less than a quarter of her requirements there, and the same is the case with the Argentine, Brazil and Uruguay, where Wales sells now one-fifth, one-eighth and one-tenth respectively of the total requirements. China too supplies only a quarter of her needs from Wales, against four-fifths before the war.

New Departure Mfg. Co. Wins Suit

The United States Court, New Haven, Conn., has handed down a decision in the case of New Departure Mfg. Co., Bristol, Conn., vs. Rockwell-Drake Corporation, Marlin-Rockwell Corporation, and Albert F. Rockwell. The decree provides that the defendants are enjoined from manufacturing, using or selling double-row ball bearings, which infringe New Departure patents; that an account be given the New Departure company as to profits; and that the defendant pay the costs of the suit.

The action brought was to restrain the defendants from an infringement of a patent for improvements in anti-friction bearings, but the plaintiff's legal title was not in dispute, and the defendants were admittedly manufacturing bearings covered by the patent in question. The defendants claimed that by reason of a contract made between the New Departure company and the defendant, Albert F. Rockwell, certain rights had arisen to the defendants which justified their manufacture of the articles to which plaintiff objected. Mr. Rockwell was long connected with the New Departure company and for some time was its president. Mr. Rockwell claimed that he was forced out without just cause with the intention of defrauding him of the benefits of the contract. The court held that the New Departure company had a right to remove Mr. Rockwell. The question turned upon the construction contract.

Profit Sharing in North Carolina

Under the new profit-sharing plan of the Newbern Iron Works & Supply Co., Newbern, N. C., the employees received a wage reduction of 10 per cent on Dec. 24. Payments were placed on a profit-sharing basis because the company has been receiving less for its products, gray iron and brass castings. Previous to the new plan, two series of wage reductions, each amounting to 10 per cent, were decreed by the officers. The first reduction was followed by a one-day walk-out; after the second reduction the profit-sharing plan was adopted. A statement to the effect that the operation of the company had been taken over entirely by the employees, which received considerable publicity, has been denied by President E. L. Willis.

The foundation work for the new units at the plant of the Indiana Rolling Mills, Newcastle, Ind., has been completed. These units comprise a new mill, engine room and offices. Work of setting the machinery in the engine room will commence shortly. Work on the office building will be postponed until the spring, but it is understood the erection of the mill will be proceeded with during the winter months.

Industrial Accidents and Their Cost

Relation of Employees' Injuries to the Cost of Manufacture—A Specific Case—The Foreman and Accident Prevention

—BY WALTER F. MULHALL*—

EVERY accident to an employee means higher manufacturing costs, to the manufacturer who carries compensation insurance as well as to the employer who is carrying his own insurance.

By way of illustration, let us consider an accident occurring in the plant of a manufacturer who carries compensation insurance, and see how this accident costs the manufacturer money over and above his insurance premiums, thereby adding to the cost of operating his plant.

John Smith, a lathe hand in the machine shop of a steel works in the State of Pennsylvania, is setting a forging in a machine tool when a worn link snaps in the chain suspending the forging. The heavy piece of metal falls on Smith, breaking his thigh (fracturing the femur). Sixteen weeks, of which 10 are spent in the hospital, elapse before Smith is able to return to work.

The Pennsylvania Compensation Law

Under the Pennsylvania Compensation Law the employer (or his insurance company) must provide necessary medical treatment for a period of 30 days after the accident, and, as Smith's earnings averaged more than $25 per week, must pay the injured man $12 a week, commencing 10 days after the accident and continuing during disability. In this case, compensation payments amounted to $175.

The insurance company, a liberal one accustomed to dealing with the spirit rather than with the letter of the law, defrayed hospital bills during the entire period the man was in the hospital instead of rejecting the bills as they might have done after the expiration of the 30-day period imposed by the law, in which event the burden would have been thrown on the injured workman. Assuming the hospital charges to have been $2.50 a day, a low average, we have a total medical expense to the insurance company of $175, making a total for medical and compensation payments of $350. Add to this the insurance company's cost of doing business, salaries of insurance adjusters, clerical work and other detail—the expense ratio, which we have seen is nearly as large as the loss ratio—and it is safe to assume that this accident cost the insurance company $500.

As Smith earned $38 a week, the accident cost him and his family, in lost wages, the difference between 16 weeks' earnings, $608, and the $175 paid him by the insurance company, or a net loss of $433.

Did the accident carry a cost for the employer as it did for the insurance company and the injured workman? Let us see.

Accidents and Diversion

The accident to Smith caused considerable excitement in the shop. Smith's machine was stopped and so were several of the machines around his. The crane operator who was setting the forging locked his crane and descended from the cab. Men dropped their work and ran to the assistance of the injured man or stood in a circle staring helplessly at him. Word was sent to the main office and caused an interruption here. Fellow-employees ran for a stretcher and carried Smith to the first-aid station, where they remained until the ambulance departed. Then they returned to the shop, where little knots of men had gathered to discuss the accident, tell of similar ones, and, very probably, condemn the company and the machine shop superintendent for permitting the use of the worn chain. Smith's machine remained idle during the remainder of the day.

Then the safety inspector came around to interview the witnesses and have them show him just where Jones was standing when the forging fell and exactly how the accident occurred. The shop superintendent had to replace Smith as soon as possible so he requisitioned the employment bureau for another lathe hand. The employment manager interviewed several applicants, hired another man, added him to the company's rolls and gave him a number and a time card. The new man was escorted to the machine shop, where the superintendent asked him some more questions and assigned him to Smith's machine.

Several weeks after the accident, and when it had been almost forgotten, an inspector from the Department of Labor and Industry, investigating serious accidents, called at the plant. In company with the safety inspector he visited the machine shop and the men whose names were on the official report as witnesses were called from their work to describe once more, in detail, how the accident had happened.

Smith had been in the employ of the company for some years. His training had cost his employers considerable money. During his disability they were deprived of the knowledge and skill which he had acquired at their expense. Until the new man became familiar with the company's products, their methods and the machine he was running, the company did not receive as much production from that lathe as it would have if Smith had not been injured. When Smith returned to work four months later he was given his old job back again, which necessitated another shift around.

Dollars and Cents Cost

The dollars and cents cost of this accident to the employer is not as easily determined as the medical and compensation expenses of the insurance company, or the employee's wage loss. But in interruption of production, the loss of a trained employee's services, the time lost by foremen and other well-paid employees, the cost of hiring a new worker and the depressing effect of the accident upon the other men, it is reasonable to assume that the cost to the employer is almost as much as the money cost to the insurance company, or the wage loss of the injured man. The cost of

*Assistant to vice-president Tacony Steel Co., Philadelphia.

hiring alone, according to those who have studied the subject, is from $50 to $100 per man. By reason of this accident the operating cost of that machine shop was at least several hundred dollars greater than it should have been.

The accident selected for illustration involved a long period of disability. But long-time disability accidents are not the only ones that are expensive to the employer. Minor injuries, even though they mean the loss of but a few days' time, or perhaps no lost time at all, also carry a cost for the employer. A workman may receive a hand or arm injury which will cause him to lose only a day, or perhaps two days. But for a number of days after he returns to work it will be necessary for him to absent himself from his work while he goes to the first-aid station to have his injury dressed, and if the company does not maintain a nurse and emergency hospital the man will lose even more time visiting a doctor located away from the plant.

Unfortunately, accident prevention, safety-first work, is generally viewed from the humane or benevolent standpoint. "Oh yes," some employers will say, "it is a splendid thing for big companies with plenty of money to promote safety-first organizations, give prizes for safety suggestions and spend money in fancy machine guards. We'd like to do the same thing, but we can't afford it."

Value of Accident Prevention

But accident prevention has a dollars and cents side. The efficient safety department is not a luxury, composed of non-producers, but is a genuine money-saving unit of any well-organized industrial establishment.

The accident which we have shown cost the employee $433, the insurance company approximately $500, and the employer an indefinite amount which was probably as much as the cost to either workman or insurance company, was caused solely by a worn chain link which parted in service. It is almost a certainty that this particular accident would not have occurred had there been in this machine shop, as there are in most up-to-date plants, frequent inspection of chains and slings. Even a cursory examination would have disclosed the worn link and the chain would have been removed from service for repairs. Such inspection could have been made the duty of the machine shop superintendent, a foreman, or other responsible employee, and would have taken but a few minutes of one man's time once a week, or, better yet, once a day. And such an inspection, in this shop, would have averted an accident which carried a subsequent money cost of more than a thousand dollars.

Rôle of the Foreman

The success of accident prevention work hinges on the foreman. Upon the attitude and co operation of the foreman depend the interest and enthusiasm of the workmen. All too common is the foreman who assents to the safety inspector's suggestion that a machine should be guarded in a certain way and promises to have it taken care of as soon as possible. But when the safety inspector turns his back the foreman says to himself, or worse still, aloud to the workmen: "Why, we've been running that machine the way it is for five years and no one ever got hurt on it. Now this darn fool wants to put a guard around it. Even if you did put the guard on the men would take it off, for it would interfere with their work."

But if that foreman was held responsible for the cost of accidents in his shop as he was for other costs he would see in that unguarded machine a hazard which may some day result in a serious accident that will run up his shop costs and affect the bonus to which he is looking forward. It will require no urging for him to have the machine guarded immediately, even if he has to do some of the work himself.

This dollars and cents view of accident prevention is not as idealistic as the conception of the safety engineer, who feels that he is his brother's keeper, and who is trying to guard the worker against his own carelessness and make the plant a safe place in which to work. But if this materialistic view of accident prevention were more generally held by employers and executives the work of the safety department would be immeasurably benefited.

Railroad Loans Approved

WASHINGTON, Dec. 28.—The New York Central Railroad Co. and a number of its subsidiaries will be able to go forward with plans for purchasing new equipment and making additions and betterments as a result of the approval by the Interstate Commerce Commission of a loan of $26,775,000. Other companies which will benefit by the loan are the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern, the Toledo & Ohio Central, the Zanesville & Western, the Kanawha & Michigan and the Lake Erie & Western. The total, which was approved in a lump sum although it will be spread among a number of companies, is larger than the record loan recently made to the Chicago, Milwaukee & St. Paul of $25,000,000.

Plans of the New York Central and its subsidiaries contemplate purchasing new equipment and making improvements totaling $56,625,000. Of this amount, the companies will be required to finance approximately $30,000,000.

The Interstate Commerce Commission has authorized the Minneapolis & St. Louis Railroad Co. to issue approximately $182,000 of promissory notes in part payment for 100 refrigerator cars at a contract price of $227,500. The equipment will be bought from the Union Refrigerator Transit Co., to which the notes will be made payable.

Issuance and sale of $4,500,000 of equipment trust certificates to J. P. Morgan & Co. at not less than 94.06 per cent of par is proposed by the Atlantic Coast Line Railroad Co. in an application filed with the commission asking authority to execute an equipment trust agreement with the Safe Deposit & Trust Co. of Baltimore. The company plans the purchase of equipment at a cost of $6,220,000 of which $1,720,000 will be paid in cash. The remainder will be covered by the certificates which will cover the $4,500,000 which is to be paid off in 15 equal annual installments of $300,000, beginning in 1922.

Purchase of freight train equipment valued at $14,233,000 by the Baltimore & Ohio Railroad is made possible as a result of the approval by the Interstate Commerce Commission of a loan of $5,200,000 to the National Railway Service Corporation for account of the Baltimore & Ohio, which is required to finance about $9,000,000 to meet the loan of the Government. The National Railway Service Corporation is approved as an agency through which loans to carriers for equipment will be made, under special authority conferred upon the commission by the transportation act.

The Albert A. Dowd Engineering Co., New York, has been organized by Albert A. Dowd, formerly president of the Service Engineering Co., Inc., 25 Church Street, and founder of such business. The new company has established offices at 131 West Thirty-ninth Street. Mr. Dowd is no longer connected with the Service company.

BELGIAN ACTIVITY

Largely in Reconstruction—Cancelled British Shipyard Contracts Taken in Antwerp

BRUSSELS, BELGIUM, Dec. 10.—Both domestic and foreign buyers in Brussels continue their tactics of delaying as long as possible before placing orders. Mills rolling rails of all sizes are well filled with orders, although the heaviest tonnages are in mills rolling large structural shapes. Among these are a number which have modernized their plants with a view to reducing costs and increasing production. These mills now feel that they are facing the necessity of either continuing to operate and piling material which they may not be able to sell in the face of German competition, or reducing operations and losing an experienced and expert personnel that has been built up with difficulty. Despite the depression throughout Belgian industry, reconstruction of plants and industrial districts continues rapidly.

The fuel supply is satisfactory, for the present at least. In some quarters there is prediction of a slight shortage late in January or early in February. German deliveries of coking coal are now almost according to agreement. About 64,000 tons was delivered in November against 70,000 tons specified. In view of radical reductions in almost every industry, it is generally felt that coal also should be reduced in price.

Belgian manufacturers are feeling German competition in foreign markets and prices continue to fall off in practically all iron and steel material with the exception of sheets for which there is still a fairly active market. Following the example of other steel producing countries, Belgian plants are considering curtailment of production. Several mills in the Centre du Hainaut have reduced wages in an effort to keep in operation over the present dull period, while it is noted throughout the industrial districts that mills closing down for holidays are inclined to suspend operations for three to four days instead of one or two.

Developments in England are not considered with optimism by Belgian producers of iron and steel. The British, under pressure of low priced German and Belgian material, have made serious reductions to meet this competition. Continental billets have sold in England £7 to £8 less than domestic billets.

Efforts in shipbuilding made by Belgium since the war have been so successful that many contracts placed with English yards at what was considered excessive prices have been canceled and the ships will be built in Belgian yards at Antwerp. The latest launching of a Belgian built ship was at the Cockerill shipyards.

Decreased Production of Coal and Coke

WASHINGTON, Dec. 28.—A heavy decrease marked the production of beehive coke during the week ended Dec. 18 according to the estimates of the Geological Survey. The total is estimated at 333,000 tons, which is 41,000 tons or 11 per cent less than the production for the preceding week. The decrease was shared by all the coke-producing states except West Virginia, where an increase of 2000 tons was attained. In Pennsylvania and Ohio the output fell off sharply. Cumulative production of beehive coke has reached a total of 20,274,000 tons, more by over a million and a quarter tons than that of 1919.

Production of bituminous coal declined slightly during the week ended Dec. 18, but remained well above the 12,000,000 mark. The total output, including lignite and coal coked, is estimated at 12,184,000 tons, a decrease of 669,000 tons, or 5 per cent when compared with that of the preceding week. The principal cause of the decrease is understood to have been a miners' election, on account of which many mines were closed on Tuesday, Dec. 14.

Production of anthracite recovered somewhat during the week ended Dec. 18. As estimated from records of cars loaded, the output was 1,979,000 tons, including mine fuel and sales to local trade. When compared with the preceding week, an increase of 64,000 tons or 3.3 per cent is shown.

The movement of bituminous coal to tidewater continued to decline during the week. For the first time since last July, less than 1,000,000 tons of coal was dumped at tidewater piers. Exports decreased nearly 22 per cent below the figure for the preceding week. The exports were only 43 per cent as great as the record of 683,000 tons attained in the week of Oct. 17.

Temple Furnace Sold

The Temple Furnace of the Seaboard Steel & Manganese Corporation, Temple, Pa., has been acquired at public sale by E. G. Tillotson, a Cleveland banker, for a consideration of $75,000. The acquisition is subject to confirmation by the United States District Court. Mr. Tillotson represents the secured creditors. If the sale is confirmed, a new company will be organized to operate the plant, which consists of two alternate stacks, one 4500 tons per month capacity and the other 6000. S. S. Freeman was appointed receiver Aug. 15, 1919, and upon his resignation last summer was succeeded by W. L. Wolfe.

Steel Trades of South Wales Depressed

WASHINGTON, Dec. 28.—Depression in the steel trade of South Wales is commented upon by Consul A. B. Cooke of Swansea as follows:

"The Swansea district claims to be normally the chief steel producing region of the United Kingdom. The steel works of the district normally supply great quantities of steel bars to the local tin plate, black plate, and galvanized sheet works for manufacture of their output, as well as the various other steel-manufacturing plants such as tube factories and steel rail works.

"Owing to temporary stagnation in the local tin plate and galvanized sheet markets, manufacturers of steel are finding it difficult to market their output, and in consequence many of the steel works have closed down for the time or have gone on part time.

"Another difficulty which local steel manufacturers have to face is competition from abroad, which has entered local markets. Belgian firms are quoting steel bars (for tin plate) at £14 per ton of 2240 pounds delivered in the works at Swansea as compared with £19 quoted by local steelworks, below which they claim they cannot sell without loss, owing to the high cost of production. Belgian firms are also quoting a higher grade steel for general manufacturing purposes at £21 c.i.f. Swansea, as compared with £31 asked by local makers."

Effect of Humidity on Leather Belting

The effect of relative humidity on leather belting was discussed by F. W. Roys, Worcester Polytechnic Institute, in a paper read before the National Association of Leather Belting Manufacturers, Nov. 17. Experiments were undertaken to determine the effect on ordinary oak tanned leather belts, not waterproofed or weatherproofed, of different humidity conditions. It was concluded that in general the effect of a change in the relative humidity is greater at high humidity than at low; that the effect is shown more rapidly in single than in double belts; that increasing the humidity shows practically immediate results, while a decrease in the humidity takes a longer time to be effective. If care were taken to adjust the belt to allow for the effect of a change of the relative humidity or if the adjustment were made when the humidity was 55 per cent, then, Mr. Roys stated, no change in humidity that would occur would either tighten or slack the belt in a degree that would be likely to give any trouble.

Prices of Tanks Reduced

The Biggs Boiler Works Co., Akron, Ohio, announces a 25 per cent price reduction on pneumatic water supply tanks, air receivers, hot water storage tanks and oil and gasoline storage tanks. The company advises that it has made these reductions in its desire to assist in bringing down the present high cost of materials used in the building trades.

BOOK REVIEWS

Industrial Oil Engineering. By John Rome Battle. Pages 1131, 5 x 7½ in.; numerous tables, charts and illustrations. Published by J. B. Lippincott Co., Philadelphia.

A handbook of industrial oil engineering and the practice of lubrication, including a revision of the Lubricating Engineers Handbook which was published in 1916. The book is comprehensive, covering the physical and chemical characteristics of fats, oils and greases, refining practices, marketing and transportation, testing, storage and handling, bearings and bearing lubricating systems, oil filtration and reclamation processes, internal combustion motors and their lubrication; the use of oil in core making and foundry practice and in metal cutting, drilling and drawing, in forging and heat treatment of steel; lubrication of mining equipment and pneumatic tools, locomotive lubrication, rust preventatives, steam cylinder lubrication, engineering data, specifications, etc.

Not only are oils, greases, etc., discussed in their capacity as lubricants, but a fairly comprehensive description is given, aided where necessary by half tones and section drawings, so that an understanding may be had of the art or practice, or the construction of the machine tool or part involved.

The book is divided into ten sections, each thumb indexed. This combined with large type sections and paragraph headings and good typographical style of the general context make for ease of reference and reading. The text is well supplemented with many well executed half tones and line drawings. The volume should be of particular value to lubricating engineers, machinery designers, mill and power plant superintendents and others interested in oil products and lubrication.

Safety in the Machine Shop is the subject of a book recently added to its accident-prevention series by the Travelers Insurance Co. It contains 188 pages, 6 x 9 in., and is bound in paper covers. The book is divided into 14 sections, the first of which sketches the development of the machine shop from the time such an establishment consisted of the proprietor and one or two assistants up to the present-day shop employing thousands of persons. In the remaining sections the safety problems that arise in the modern shop are discussed in detail and careful consideration is given to cranes, lathes, automatic machines, grinding apparatus and other machine-shop equipment. In addition to the discussion of safeguarding, and safe-operating methods, subjects indirectly related to accident prevention are considered. One section, for instance, treats of infection from cutting oils and another deals with the subject of proper illumination and its bearing on the accident prevention problem. The book will be sent free of charge on application to supply department, Travelers Insurance Co., Hartford, Conn.

A report of the conference on employment and education held by the American Association of Engineers in Chicago, Nov. 12, is now available in pamphlet form. An extended report of the meeting was printed in THE IRON AGE of Nov. 18. Among the papers is one entitled "What An Employer Requires When Engaging an Engineer," by Frank D. Chase, president Frank D. Chase, Inc., and one on "The Trend of Specialization," by William E. Vogelback of Sanderson & Porter.

The Detroit Steel Products Co., Detroit, has increased its capitalization to $5,250,000 and declared a common stock dividend of 300 per cent. Thus has been distributed a portion of the company's surplus accumulated during the past 10 years. During the present period of dullness the plant's employees are largely employed in a thorough overhauling of equipment, so that the whole organization may be in condition to meet prospective improved demand.

New Books Received

Advertising the Technical Products, by Clifford Alexander Sloan and James David Mooney. Pages x + 365; 6 x 8¾ in. Published by the McGraw-Hill Book Co., 239 West Thirty-ninth Street, New York, and for sale by THE IRON AGE book department.

Powdered Coal as a Fuel, by C. F. Herington. Second edition. Pages xii + 338, 6 x 9 in. Published by D. Van Nostrand Co., 8 Warren Street, New York.

Labor's Crisis, an employer's view of labor problems. By Sigmund Mendelsohn. Pages 171, 5 x 7½ in. Published by the MacMillan Co., 6464 Fifth Avenue, New York.

The Human Motor, or scientific foundations of labor and industry. By Jules Amar, director of the research laboratory of Industrial Labor at the Conservatoire National des Arts et Metiers, Paris. Pages 466, 5½ x 8¾ in., 309 illustrations and numerous tables. Published by E. P. Dutton & Co., New York.

Proceedings Annual Convention Industrial Relations Association of America held May 19, 20 and 21, 1920, Chicago. In two parts: Part I, main sessions and Part II, subject and sectional sessions. Pages 722, 6 x 9 in. in paper cover. Published by the Industrial Relations Association of America (The National Association of Employment Managers), administrative offices, Orange, N. J.

Trustees of the Chamber of Commerce of Seattle have gone on record as advocating the use of wood stave pipe by the city in the building of the proposed new reservoir pipe line. Figures were produced by the chamber showing that the city by using wood stave pipe, made in Seattle from Washington timber, would save about one-half compared with the use of steel, which would have to be hauled to Seattle from Eastern mills, and on which the freight charges would be very heavy. The city estimates the cost of the projected water line as about $3,000,000, and it is claimed the wood stave pipe can be put in at an actual saving of $70,000 per mile.

Youngstown Sheet & Tube Co., Youngstown, Ohio, has extended the period in which employees are permitted to subscribe for non-par value stock under a deferred payment plan. The 1920 offering was 20,000 shares, of which over 10,000 shares have been subscribed for. In a message to workers, President James A. Campbell declares the stock is cheap at the price offered and points out that the cost will be reduced $25 per share at the end of five years, by reason of a $5 yearly bonus.

The United States court at Seattle has handed down a decision denying the petition of the United States Government to have a receiver appointed for the Sloan Shipyards Corporation, the Anacortes Shipbuilding Co., and the Capital City Iron Works. The court held that it had no authority to seize and dispose of the property of the defendants. Permission was given to the Government to amend the complaint so that other action might be taken.

The Northwest Bridge & Iron Co., Portland, Ore., is building seven tankers for the Swiftsure Oil Trans-Builders, each being 12,000 tons deadweight. The first of these tankers was launched on Wednesday, Dec. 15.

The Barde Industrial Corporation of Seattle has purchased the structural steel on hand at the plant of the Vulcan Mfg. Co., Seattle, and the latter concern will retire for the time being from the structural steel trade.

The Champion Blower & Forge Co., Lancaster, Pa., states that it has not made a wage cut of 10 per cent and reduced the plant to a 9-hr. basis, as reported, but is still running on the same time on which it has been running since April 1, 1920. The only wage change has been the removal of the bonuses which were placed on the work during the war.

The Bollstrom Motors, Inc., of St. Louis, Mich., which recently increased its capitalization from $300,000 to $2,000,000, has elected F. W. Crawford, president.

Machinery Markets and News of the Works

HOLIDAY PERIOD DULL

Most of the Prospective Machine Tool Buying Postponed

New Business Is Almost Negligible—Few Formal Price Changes, But Concessions Are Being Made

The final week of the year finds the machine-tool trade throughout the country in the same state of dullness which has prevailed for two months or more. Most of the prospective business has been put over by buyers until after Jan. 1. There is a reasonably hopeful feeling in the trade that some of this prospective business will be placed early in the new year.

There is encouragement in the report from the Cleveland machine-tool trade that some of the automobile manufacturers are planning to increase production earlier than was expected. In one instance an increased production schedule, timed to go into effect on March 1, has been set ahead to Feb. 1. However, not much buying of machine tools is expected from the automobile industry before late spring or early summer.

The large automobile plant at Marysville, Mich., being constructed by C. H. Wills & Co., is going ahead, regardless of general business conditions. Machine-tool manufacturers have received instructions to deliver shop equipment as promptly as possible.

Few manufacturers of machine tools have made formal reductions in prices, but the situation is to a large extent in the hands of buyers, who insist upon concessions when they have an order to place. In some instances, concessions have been granted amounting to at least 15 per cent.

New York

NEW YORK, Dec. 28.

Christmas week was exceedingly dull in the local machine-tool trade. Most of the live prospects have notified those from whom they have received quotations that their buying has been put over until the new year. There is no confidence that the mere turn of the calendar will bring out any substantial volume of business, but some improvement is expected to come early in the year.

The Van Dorn Steel Products Co., 30 Church Street, New York, affiliated with the Van Dorn Iron Works Co. of the same address, manufacturer of metal furniture, etc., with plant at Cleveland, has acquired about 10,000 sq. ft. on William Street, Long Island City, as a site for branch works. Plans will be prepared at an early date.

Although there are several good sized orders for electric cranes pending, they will probably be held over until the first week in January. Many crane buyers who have inquiries in the market believe that with lower prices in steel and the prospect of better labor conditions prices of cranes should be reduced and are consequently delaying the placing of orders as long as possible.

The Fay Auto Lock Corporation, New York, has been incorporated with a capital of $50,000 by C. B. Greenberg, H. Kottler and J. Kainen, 2230 Eighth Avenue, to manufacture locks and special locking devices.

The Matlack Coal & Iron Corporation, 52 Vanderbilt Avenue, New York, has increased its capital from $100,000 to $500,000.

The Tock Screw Machine Products Corporation, 203 Eighth Street, Brooklyn, has filed notice of dissolution under State laws.

The Kingston Dry Dock & Construction Co., Kingston, N. Y., has been incorporated with an active capital of $525,000 by E. Salisbury, G. A. Fagan and M. E. McGuiness, Kingston, to operate a ship construction and repair plant.

The Consolidated Tool Works, Inc., 261 Broadway, New York, has increased its capital from $101,000 to $151,000.

The Clydesdale Motor Truck Co. of New York, New York, has been incorporated with a capital of $50,000 by F. T. Davies, W. B. Groat, Jr., and G. B. Godfrey, 437 Fifth Avenue, to manufacture motor truck equipment and parts.

The Generator Valve Co., 47 Dinsmore Place, Brooklyn, has increased its capital to $40,000.

A new two-story brick plant, 100 x 250 ft., to cost about $400,000 with machinery, will be erected by the Gretch Engineering Corporation, 103 Park Avenue, New York, for the Continental Folding Paper Box Co., 122 Washington Avenue, Brooklyn, at Ridgefield, N. J. W. B. Wills, 1153 Myrtle Avenue, Brooklyn, is architect.

The American Blind Stitch Machine Co., 325 Lafayette Street, New York, has increased its capital from $165,000 to $365,000.

J. Livingston & Co., 70 East Forty-fifth Street, New York, manufacturers of electrical equipment, with branch at 104 East Forty-first Street, have increased their capital from $600,000 to $1,000,000.

The Brooklyn Metal Wheel Toy Co., Brooklyn, has been incorporated with a capital of $40,000 by M. J. and V. S. Alberts and H. Perlmutter, 1731 Sixtieth Street, to manufacture metal toy specialties.

An automobile service shop, including machine and repair department, 100 x 230 ft., to cost about $45,000, will be erected at Fordham Road and Hughes Avenue by the Spring Street Garage Co., 201 West 104th Street, New York. Plans have been prepared.

Untermeyer, Robbins & Co., 71 Nassau Street, New York, jewelry manufacturers, with factory at 38 Ferry Street, have increased their capital from $500,000 to $750,000.

The Newark Auto Parts Co., 75 Mt. Prospect Avenue, Newark, advises that it is a dealer in automobile equipment and not a manufacturer, as previously stated.

The Klett Mfg. Co., 202 East Forty-sixth Street, New York, manufacturer of scientific apparatus, has increased its capital from $25,000 to $100,000.

The J. O. Ross Engineering Corporation, New York, has been incorporated with an active capital of $105,000 by F. W. Bolowicz, B. G. Smith and E. P. Murphy, 30 East Forty-second Street, to manufacture heating and ventilating apparatus.

Foundation work is under way for structures to form the new plant of the Cumberland Glass Co., Bridgeton, N. J., estimated to cost about $3,000,000 with machinery. The works will include a machine shop and other mechanical buildings. The company is affiliated with the Illinois Glass Co., Alton, Ill.

The Macartney-Somes Milking Machine Co., 38 Myrtle Avenue, Bloomfield, N. J., has been incorporated with a capital of $300,000 by A. C. Macartney, James J. Clark and L. N. Somes to manufacture milking machinery.

The Stafford Rolling Bearing Car Truck Corporation, Carlstadt, N. J., has been incorporated with a capital of $1,000,000 by A. M. Thiery, Raymond E. Cook and William J. Gilleran, to manufacture cars, trucks and parts. James Kerr, Berry Avenue, is local representative. The main plant will be located at Clarksville, Tenn.

A power plant will be built by the Board of Education, Elizabeth, N. J., Walter B. Timms, president, in connection with the improvements and extensions to be made at the Battin High School, South Street, estimated to cost about $350,000. C. Godfrey Poggi, 275 Morris Avenue, Elizabeth, is architect.

The K. B. N. Rotary Motors Corporation, Grantwood, N. J., has been incorporated with a capital of $125,000 by

Edward W. Norton, Peter E. Brulatour and William R. Krebs, Grantwood, to manufacture motors and parts.

The Standard Oil Co. of New Jersey, Bayonne, N. J., has filed notice of increase in capital from $300,000,000 to $310,000,000.

The John W. Ferguson Co., Paterson, N. J., contractor, has acquired property at Gouvernor and Ogden streets, Newark, N. J., 100 x 400 ft., for the establishment of an industrial plant.

The Kuenneth System, Inc., Paterson, N. J., has been incorporated with a capital of 2000 shares of stock, no par value, by Oswald and George W. Kuenneth, 45 Hamilton Avenue, to manufacture textile machinery and parts.

Considerable machinery, including electrically operated hoisting and conveying apparatus, yard cranes, etc., will be installed by the Fulton Lumber Terminal Co., Jersey City, N. J., at its new plant on the Hackensack River, near the city limits. The company was recently organized with a capital of $1,000,000. B. F. Fitch, president Motor Terminals Co., 61 Broadway, New York, is interested in the new concern.

The Original Tool & Die Works, Inc., Newark, N. J., has leased space in the building at 344-50 Mulberry Street, for the establishment of a plant for the manufacture of dies, snap-fasteners, tools and kindred products. John Kovats is president.

The Federal Supply Co., 397 South Ninth Street, Newark, has filed notice of organization to manufacture tools, dies, machine parts, etc. Anthony A. Weis heads the company.

The Sun Electric Lamp Co., Newark, has been incorporated with a capital of $50,000 by August B. Rosasco and Ralph C. Dick, 129 Oliver Street, to manufacture electrical specialties.

Catalogs Wanted

G. Pariani, 32-A Corso d'Italia, Rome, Italy, desires catalogs and price lists of manufacturers of machinery for making and packing pins and needles.

New England

BOSTON Dec. 27.

A limited number of single tools have been purchased the past week, but the market otherwise has continued quiet. Additional inquiries have been received, however, and some give promise of developing into orders in the early part of 1921. A Providence, R. I., concern purchased much of the equipment of the Bristol Machine & Tool Co., Bristol, Conn., recently offered at auction. New England railroads continue to show little interest in the market, although two have intimated they will take some action in March or before. The Boston & Albany Railroad has closed its West Springfield and Allston car shops until further notice, releasing approximately 300 men. A Philadelphia maker of hammers has notified local representatives of a 10 per cent reduction in prices. No other changes in quotations are reported.

A Boston stone concern has purchased a 10-ton crane for its new Somerville, Mass., plant, and another stone company in western Massachusetts has closed on a second-hand 10-ton crane. Bids on the 50-ton locomotive jib crane for the naval dry dock, South Boston, were rejected.

Some New England manufacturers of bench lathes are receiving many inquiries regarding 1921 shipments, many of which practically assure business.

A few special machinery builders are running full time with no reduction in working forces, partly on repair work and new machines. In addition, there is considerable overhauling and replacement of dies used by electric appliance and clock manufacturers and other industries.

Screw machine products are selling in a small way and the leading producers for the first time this year have fairly large stocks on hand. One of the largest machine screw products interests last week reduced prices on cap and set screws 20 per cent.

Work has started on a two-story, 50 x 100 ft. manufacturing building for the Faber Cornice Co., Pawtucket, R. I.

The Wallace-Barnes Co., Bristol, Conn., purchased the property of the Bristol Machine & Tool Co., that city, recently sold at auction. The company did not, however, buy the equipment.

Bids are being received for the construction of a two-story, 50 x 100 ft. plant to be erected in the Allston district, Boston, by the T. L. Harkins Machine Co., Farnsworth Street, Boston.

The rumor that the Clinton, Mass., branch of the Wickwire-Spencer Steel Co. is to be sold is officially denied. Several departments in that plant have been moved because of better transportation accommodations elsewhere.

The Boston & Providence Railroad Corporation has sold to Manning, Maxwell & Moore, Inc., machine tools, the property at the corner of Watson and Camden streets, Boston. No definite plans have been made by the new owners regarding the property.

The Wade-American Tool Co., Waltham, Mass., precision bench machines, tool gages, etc., expects to have its new plant in full operation soon after the turn of the year. It has about 50,000 sq. ft. of floor space. Walter H. Wade is the manager.

The business of Charles B. Foster & Co., Worcester, Mass., motor trucks, has been taken over by the G. F. H. Corporation, Worcester, recently incorporated under Massachusetts laws with a capital of $252,000, and will be moved to Denver, Col., where there is a larger field for tractors. The new concern will maintain offices in Worcester and Boston. George B. Foster, Westboro, is president; Jerome R. George, Worcester, vice-president and treasurer; and Arthur O. Higginbotham, Worcester, manager. Mr. George also is vice-president, Morgan Construction Co., Worcester.

The Seifert Special Machine Co., Hartford, Conn., has changed its name to the Sexton Machine Co.

A final certificate of dissolution has been filed with the State of Connecticut by the Elm City Brass & Rivet Co., Plainville, Conn.

Plans are being figured for a two-story factory to be erected by the American Insulating Co., Norwalk, Conn. Bids are being submitted to Emile Hemming, president, 30 Church Street, New York.

The Connecticut Blower Co., Inc., Hartford, Conn., is offering for public subscription $150,000 8 per cent cumulative preferred stock. The buildings occupied by the company have been sold, and funds derived from the sale of the stock will be used to purchase a site and erect a new plant.

The Reed & Prince Mfg. Co., Duncan Avenue, Worcester, Mass., manufacturer of bolts, nuts, screws, etc., has filed plans for the erection of a one-story addition, 40 x 290 ft.

The United States Motor Corporation, Boston, has leased a two-story, reinforced-concrete building, 75 x 200 ft., to be erected by Lewis K. Alintuck, 34 School Street, on Fordham Road, Allston district, for an automobile works. The plant is estimated to cost about $150,000. Tuck, Gilman & Snyder, 34 School Street, architects, represent the owner and lessee.

The Axle Valve Co., Boston, has been incorporated with a capital of $25,000 by Michael J. and Jules R. Timmins, and John D. Kaps, 31 Elm Street, Springfield, Mass., to manufacture valves and specialties.

The Waterbury Tool Co., Waterbury, Conn., has filed notice of increase in capital from $500,000 to $1,000,000.

The Rite Wa Oil Heating Co., Quincy, Mass., has been incorporated with a capital of $500,000 by Loren R. Churchill, A. S. Sandberg and George A. Wardwell, 141 Glendale Road, to manufacture heating equipment and devices.

The Auto Car Sales & Service Co., 302 Pearl Street, Providence, R. I., has completed plans for a three-story service and repair building at Pearl and Rice streets, 45 x 80 ft., to cost about $50,000.

The American Toy Battleship Co., Boston, has been incorporated with a capital of $200,000 by William L. Thompson, H. L. Goodman and Hyman Philips, 7 Bosworth Street, to manufacture mechanical toys.

John Des Garabedian, 304 Beacon Street, Somerville, Mass., has filed plans for a one-story machine shop, 24 x 43 ft., on Beacon Street.

Chicago

CHICAGO, Dec. 27.

A genuine holiday lull has settled on the machinery market, and action on many inquiries has been postponed until after the first of the year. Some consumers have asked that shipments against old orders be held up until January. Despite the assiduous efforts of salesmen to discover new prospects, new business is almost negligible. One important local dealer has reduced his sales force. Among the few industrials which have bought equipment of late is the Vitalux Cinema Co., Milwaukee, manufacturer of moving picture machines for the home, which purchased tool room equipment including an engine lathe, milling machine and two automatic screw machines.

Although the last few months have been dull in the machinery trade, it is probable that sales totals of local dealers for the entire year will compare favorably with those of 1919. This will hold true despite heavy cancellations from the automotive industry.

The King Varnish Co., 4510-18 West Roosevelt Road, Chicago, has let a contract for a one-story machine shop, 20 x 50 and 15 x 15 ft., to cost $7,000.

The Common Sense Mfg. Co., 7 South Dearborn Street, Chicago, has been incorporated with $25,000 capital stock to manufacture valve grinders, castings, implements, machinery, mechanical appliances, etc. The incorporators in-

clude Thomas L. Diggens, Wilbur Reid and Theodore E. Guy.

The Miles Piston Ring Co., 900 West Jackson Boulevard, Chicago, has let contract for a one and two-story factory, 98 x 161 ft., at 5345-53 South State Street, to cost $60,000.

The Weir & Craig foundry, northeast corner Wallace Street and Twenty-fourth Place, Chicago, has been sold to William B. McIlvaine.

The Gill Mfg. Co., 8300 South Chicago Avenue, manufacturer of automobile parts, will build a one-story plant, 81 x 121 ft., to cost $21,000.

The Stewart Wire & Steel Co., Frankfort, Ill., contemplates the construction of a two-story factory and office addition, 60 x 85 ft., to cost $70,000.

The Chicago, Indianapolis & Louisville Railroad Co., Monon Route, 608 South Dearborn Street, Chicago, has awarded contract to A. E. Kemmer, Fourth and South streets, Lafayette, Ind., for a one-story car repair shop at Lafayette, 80 x 400 ft., estimated to cost about $175,000 with equipment.

The Automatic Machine Screw Products Co., Chicago, has increased its capital from $16,000 to $175,000.

The Chicago Malleable Castings Co., Chicago, has increased its capital from $100,000 to $1,500,000.

The Chakra Automatic Soldering Machine Co., 140 North Dearborn Street, Chicago, has been incorporated with a capital of $100,000 by Benjamin I. Morris, Harry Z. Perel and Nathan S. Schienbrod, to manufacture special machinery.

The Mount Vernon Furnace & Mfg. Co., Mount Vernon, Ill., has awarded a contract to the W. N. Atkinson & Jones Construction Co., Mount Vernon, for a one-story plant, 100 x 250 ft., to cost $75,000. M. Mullen is president.

The Peoria Auto Parts Co., Peoria, Ill., has completed plans for a new one-story factory to cost about $20,000.

The Gregory Electric Co., 1601 South Lincoln Street, Chicago, manufacturer of electrical products, has increased its capital from $300,000 to $1,000,000.

The Miami Metals Co., Chicago, manufacturer of metal products, has increased its capital from $600,000 to $1,500,000.

The Common Sense Ice Machine Co., 315 South Wabash Avenue, Chicago, has been incorporated with a capital of $100,000 by Herman C. and Edwin C. Fritz, and George G. Foster, to manufacture ice-making machinery and refrigerating apparatus.

The East St. Louis Locomotive & Car Co., 5483 Ellis Avenue, Chicago, has preliminary plans under way for its new plant on site recently acquired at East St. Louis, Ill., estimated to cost close to $1,000,000 complete. R. W. Crawford is engineer.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, will defer the erection of its one-story plant, 50 x 120 ft., until early in the spring. A. G. Lund, 449 West Sixty-third Street, is architect.

The Apex Electric Mfg. Co., Chicago, manufacturer of electrical appliances, has increased its capital to $100,000.

The Old Reliable Motor Truck Co., 3921 South Michigan Avenue, Chicago, manufacturer of automobile trucks, has filed notice of increase in capital from $200,000 to $700,000.

Detroit

DETROIT, Dec. 27.

Work has begun on plans for the expansion program of the Michigan Brass & Iron Works, Lansing, Mich. According to T. E. Hackett, secretary, treasurer and general manager, the brass and iron foundries will be separated and enlarged, the new brass foundry to be 40 x 125 ft. The improvements will be made early in the spring.

The contracts have been let by the New York Bed Spring Co., Detroit, for a three-story factory at Brady and St. Antoine streets, Detroit.

Fire caused a loss estimated at from $5,000 to $7,000 in the steel table department of the Brunswick-Balke-Collender Co's plant in Muskegon, Mich., a few days ago.

The Grand Rapids Malleable Co., Grand Rapids, Mich., has plans under way for a new coal pulverizing plant, 35 x 65 ft., in the vicinity of Fuller Junction, to cost about $100,000 with machinery.

The McMullen Machinery Co., Grand Rapids, Mich., has increased its capital from $100,000 to $250,000.

The Telltale Spark Plug Co., Detroit, has been incorporated with a capital of $50,000 by Isaac Ransom, O. H. Talines, and Isaac Harris, 5641 Carnes Avenue, to manufacture patented spark plugs and other ignition equipment.

The Consumers Power Co., Grand Rapids, Mich., is considering the erection of an addition to its electric generating plant to cost about $400,000, including machinery. George L. Erwin is general manager.

The Detroit File Renewing Co., Detroit, has changed its name to the Detroit File Corporation.

The American Twist Drill Co., Detroit, has filed notice of change of name to the American Twist Drill & Tool Co., at the same time increasing its capital from $200,000 to $400,000.

The Jennings Engineering Co., Detroit, has been incorporated with a capital of $25,000 by Jarvis S. Jennings, Jr., H. and Fritz Goebel, 310 Seminole Avenue, to manufacture governors for internal combustion engines, and other products.

Frederick Frederickson, Benton Harbor, Mich., is organizing a company to manufacture a farm tractor, of which he is the inventor. It is planned to incorporate with a capital of $2,500,000 under the name of the Michigan Tractor Co. The proposed works will be located at Lansing, Mich.

The Gear Grinding Machine Co., Detroit, has increased its capital from $300,000 to $400,000.

The Detroit Steel Products Co., 2250 East Grand Boulevard, Detroit, has increased its capital from $1,250,000 to $5,250,000.

The General Machine & Tool Co., Jackson, Mich., has changed its name to the Vulcan Engineering Co. and increased its capital from $100,000 to $250,000.

Kauffman & Co., Detroit, manufacturer of tools, has changed its name to the Detroit Plier Co.

The Universal Body Co., Jonesville, Mich., manufacturer of automobile bodies, has increased its capital from $25,000 to $101,500.

F. C. Mason & Co., Inc., St. Johns, Mich., manufacturer of agricultural implements, has increased its capital from $325,000 to $365,000.

Philadelphia

PHILADELPHIA, Dec. 27.

The William B. Young Co., Philadelphia, is being organized under the direction of Harnitz & King, Bergner Building, Harrisburg, Pa., to manufacture gas and electric fixtures and other metal products. Application for a State charter will be made on Jan. 15.

The American Engineering Co., Aramingo and Cumberland streets, Philadelphia, manufacturer of steering equipment, machinery, etc., has awarded a contract to the Austin Co., Bulletin Building, for a one-story machine shop and foundry at Sepviva Street and Wheatsheaf Lane, to cost about $25,000.

The Broad Mfg. & Supply Co., Philadelphia, is being organized by Frank A. Moorshead, Commonwealth Building, and associates to manufacture steam, water, gas and electrical equipment. Application for a State charter will be made on Jan. 3.

The Stokes Asbestos Co., Trenton, N. J., has been incorporated with a capital of $1,000,000 by William J. B., Robert J. and Joseph O. Stokes, to manufacture brake lining for automobile service, and kindred products. The company will operate works on a site near the Mercer Automobile Co., and plans to commence operations at an early date.

The Crossley Machine Co., State and Monmouth streets, Trenton, N. J., manufacturer of machinery for the ceramic industry, has increased its capital from $125,000 to $250,000. David Crossley is president.

The T. R. Roberts Filter Mfg. Co., Philadelphia, has disposed of its plant at Ruan and Tackawanna streets, Frankford, to Basch & Co., Front and Reed streets, manufacturer of planing mill products. It consists of a two-story factory, foundry and power house, with land, 94 x 110 ft., and will be occupied by the new owner.

At a special meeting of stockholders of the Atlas Portland Cement Co., Northampton, Pa., approval was voted for an increase in capital from $14,000,000 to $23,000,000. A portion of the proceeds will be used for the erection of a new mill, and extensions and improvements to present plants.

The Chester Iron & Metal Co., Lock Haven, Pa., has been incorporated with a capital of $50,000 to manufacture metal products. Ellis Claser, Lock Haven, is treasurer.

The J. S. Wentz Co., Markle Building, Hazleton, Pa., is having plans prepared for a new coal breaker at its properties near Raven Run, Pa., to cost about $150,000. G. S. Troutman, Markle Building, is architect.

The Scranton Coal Co., Board of Trade Building, Scranton, Pa., is said to be planning for the early rebuilding of Raymond colliery and washery at Peckville, destroyed by fire Dec. 13, originating in the power house with loss estimated at $250,000, including machinery.

The Sharon Steel Hoop Co., Sharon, Pa., is having plans prepared for its new two-story plant, estimated to cost about $150,000 with machinery. The J. H. Herron Co., 1360 West Third Street, Cleveland, is architect and engineer.

The Speakman Co., 816 Tatnall Street, Wilmington, Del.,

manufacturer of sanitary products, steam specialties, etc., has increased its capital from $567,200 to $900,000.

Fire, Dec. 22, destroyed the machine shop, car shop and forge building at the Colerain Colliery of the A. S. Van Wickle Estate, Hazelton, Pa., with loss estimated at about $35,000.

The Smith Burner & Oil Co., Buffalo, has commenced the erection of branch works at Walnut and Front streets, Allentown, Pa., one story, 50 x 125 ft. Butz & Calder, Allentown, have the contract.

Buffalo

BUFFALO, Dec. 27.

The Stanley Steel Welded Wheel Corporation, 40 Court Street, Boston, has commenced excavations for its new one-story plant on Walck Road, North Tonawanda, N. Y. It will be the first unit of extensive works. The building, 100 x 200 ft., with machinery, is estimated to cost about $100,000. J. T. McMurray is president.

The Century Cement Machine Co., Brown's Race, Rochester, N. Y., manufacturer of cement machinery, has been merged with the Willsea Works, Inc., under the latter name.

The City Council, Buffalo, is considering the installation of electrically operated pumping machinery at the Ward pumping station to furnish water under high pressure for fire purposes, replacing present fireboats. The installation, with pipe lines, is estimated to cost about $400,000.

The Warsaw Elevator Co., South Main Street, Warsaw, N. Y., manufacturer of elevators and elevator mechanisms, has increased its captial from $250,000 to $500,000.

The J. P. Jones Co., Binghamton, N. Y., has been incorporated with a capital of $20,000 by L. W. Evans, G. A. Thompson and J. P. Jones, Binghamton, to manufacture engines and boilers.

Fire, Dec. 21, destroyed the plant of F. A. Read & Co., Liberty Street, Albion, N. Y., manufacturers of corrugated pads, with loss estimated at about $175,000. The loss on machinery alone is estimated in excess of $40,000.

The W. W. Cónde Hardware Co., Watertown, N. Y., has increased its capital from $130,000 to $200,000.

The Marsh Valve Co., 507 Marine Bank Building, Erie, Pa., is considering the erection of a two-story and basement plant, 50 x 125 ft. W. C. Marsh is president.

The Overland-Jamestown Co., Inc., 107 West Fourth Street, Jamestown, N. Y., has awarded contract to the Jamestown Construction Co., 60 River Street, for a two-story and basement automobile service and repair building, 40 x 100 ft., at Fourth and Washington streets.

The Syracuse Washing Machine Corporation, Syracuse, N. Y., manufacturer of mechanical laundry machinery, has increased its capital from $6,500,000 to $7,000,000. The company recently completed the erection of a new plant.

Baltimore

BALTIMORE, Dec. 27.

The Republic Boiler & Radiator Co., Maryland Casualty Tower, Baltimore, recently organized with a capital of $1,000,000, has obtained a site on Union Avenue, Woodberry, for its new plant, to include machine shop, foundry and general assembling department. It is said that the works with machinery will cost about $200,000. Enos S. Stockbridge and William Lentz head the company.

The Maryland Automobile Products Co., Hagerstown, Md., has ben incorporated with a capital of $50,000 by James J. Boyle, John M. Hammersla and George E. Slaybough, to manufacture automobile equipment and parts.

The Air Reduction Co., 120 Broadway, New York, has acquired property at Fayette and Eleventh streets, Baltimore, as a site for a local plant. No announcement has been made as to when it will be built.

The Eastern Rubber Products Co., 361 North Calvert Street, Baltimore, recently organized, is arranging for the installation of rubber-working machinery in a building for its new plant. Charles M. Wyatt is president and manager and Chester B. Kegarice, secretary and treasurer.

The F. N. Hayes Machine Co., 1511 South Jefferson Street, Roanoke, Va., has plans under way for a one-story addition, 50 x 100 ft. F. N. Hayes is president.

C. G. Mercer, 218 North Ninth Street, Richmond, Va., and associates have plans under way for a three-story automobile service building and repair works, 50 x 140 ft., at 608 East Grace Street, to cost about $50,000.

The Virginian Co., Lynchburg, Va., has been incorporated with a capital of $50,000 by J. P. Robertson, Lynchburg; Dean S. House and Jefferson R. Palmer, Charlotte, N. C., to manufacture sanitary metal drinking equipment.

Fire, Dec. 19, destroyed a portion of the plants of the Macon Iron & Paper Co. and the Southern Vulcanizing Co., Macon, Ga., with loss estimated in excess of $50,000.

The Towers & Sullivan Mfg. Co., Rome, Ga., manufacturer of agricultural implements, is planning for a new one-story brick and steel machine shop, to cost about $75,000, including equipment.

The Norfolk & Western Railroad Co., Roanoke, Va., has plans under way for the erection of its new power plant at Radford, Va., site for which was recently purchased.

The Trion Co., Trion, Ga., has completed plans for a three-story addition to its electric power plant, 25 x 40 ft., to cost about $100,000 with equipment.

The City Council, Kingston, N. C., has completed plans for its new municipal electric power plant to cost in excess of $200,000, including machinery. Joseph Dawson, mayor, is in charge.

The International Machine Co., Baltimore, has been incorporated with a capital of $100,000 by Huntington D. Hawkins, Francis L. Klemm and George P. Chambers, 110 East Lexington Street, to manufacture machinery and parts.

The Shivar Spring Co., Baltimore, manufacturer of springs, etc., has increased its capital from $400,000 to $1,000,000.

The Hubbert-Groff Implement Co., Inc., Cambridge, Md., has been incorporated with a capital of $50,000 by Edgar S. Hubbert and John E. Groff, to manufacture farm implements and machinery.

Morton McI. Dukehart & Co., 641 Light Street, plan to build a one-story concrete and glass machine shop and foundry, 40 x 125 ft., to cost about $30,000.

The Crown Cork & Seal Co., Baltimore, is said to be considering the establishment of a plant in Sydney, Australia. Its Baltimore works has suspended operations until Jan. 5, when work will be resumed with a complete force. John M. Hood, Jr., is president.

Pittsburgh

PITTSBURGH, Dec. 27.

The Griffith-Durst Commercial Body Co., Pittsburgh, manufacturer of automobile bodies, has leased property at 345-47 Boquet Street, Oakland, comprising about 9000 sq. ft. of space for a manufacturing plant.

The National Electric Tool Co., Pittsburgh, is being organized by John A. Metz, Thomas D. Murray and S. E. Wentley, to manufacture electrical tools and appliances. Application for a State charter will be made on Jan. 17. John A. Metz, 507 B. F. Jones Law Building, represents the company.

The Pennsylvania Lubricating Co., Thirty-fourth Street, Pittsburgh, has plans under way for a two-story addition, 72 x 125 ft.

The International Drawn Tube Co., Pittsburgh, recently organized, has acquired about 7 acres at the Anderson Road Station, Pittsburgh & Lake Erie Railroad, near Coraopolis, Pa., with river frontage, as a site for its new works. Plans for a main tube mill and adjoining structures will be prepared at an early date. Perry Tygard and John Porreco head the company.

The Witzberger Heating Appliances Co., Pittsburgh, is being organized by Etienne Witzberger, F. W. Kersting and Frank Stifter, to manufacture heating appliances and equipment. Application for a State charter will be made at an early date. Clarence B. Nixon, 421 Frick Building, represents the company.

The Flood City Mfg. Co., Messenger and Elder streets, Johnstown, Pa., manufacturer of brass and bronze products, is considering the erection of a two-story, brick and steel addition, 80 x 200 ft., to cost about $200,000, including machinery. J. L. Hershberger is president.

The Newcomerstown Clay & Coal Co., Newcomerstown, Pa., recently organized with a capital of $150,000, is planning for the electrification of its brick plant, lately purchased. It will be remodeled and new machinery installed.

The Jackson & Grow Machine Co., Morgantown, W. Va., is said to be planning to rebuild the portion of its foundry recently destroyed by fire with loss estimated at $12,000.

The Fowler Branch Coal Co., Farrellsburg, W. Va., recently organized, is planning the construction of a new tipple on property lately acquired.

The addition to be erected by the Wheeling Steel Corporation, Wheeling, W. Va., at Yorkville, Ohio, is estimated to cost about $150,000 with machinery, and will be used for the production of lithographed tin specialties. It is proposed to have the factory ready for service in April.

The Baltimore & Ohio Railroad Co., Baltimore, denies the report of intention to build an addition to its shops at Gassaway, W. Va.

Cleveland

CLEVELAND, Dec. 27.

The volume of orders for tools continues light and limited to single machines. The outlook, however, has become a little more promising in that some preliminary inquiries have come from buyers who have started to line up small lots of machines that probably will be purchased early in the year. Some of the inquiries are for single purpose lathes and are from automobile plants in this section.

Some automobile manufacturers in the Detroit district are planning to increase their production earlier than they had intended. It is understood that one of the larger plants in Michigan will start Feb. 1 on a production schedule that it had arranged to place in effect March 1. However, machine tool builders do not look for much activity in the Detroit market before late spring or early summer. It is expected that when the automobile plants again get under a fair production schedule orders placed this year and held up a few months ago will have to be released. C. H. Wills & Co. who are equipping a new automobile plant at Marysville, Mich., are going ahead with a regular program and are asking that all machinery purchased be delivered as promptly as possible.

The Landall Farm Tractor Co., Carey, Ohio, has been incorporated with a capital stock of $500,000 and contemplates the erection of a plant for the manufacture of farm tractors. It has taken over the assets of the Landall Tractor Co., Toledo, Ohio. I. G. Huston is president and R. M. Lucky, vice-president and secretary.

The Eagle Bolt & Forging Co., Cleveland, manufacturer of drop forgings and engaged in doing special upset work, is erecting an addition doubling its present size. Four additional hammers and other equipment will be installed. The company has increased its capital stock from $50,000 to $150,000.

The Converse Foundries Co., Alliance, Ohio, has been incorporated with a capital stock of $100,000. It recently placed a new foundry in operation.

The Cleveland Refrigerator Co., Cleveland, has had plans prepared for a one story factory, 60 x 273 ft.

The Holt Farm Light Co., Toledo, Ohio, has been incorporated with a capital stock of $1,000,000 and will establish works for the manufacture of farm lighting plants. It will take over the business of the Automatic Light Co., Inc., Ludington, Mich. L. W. Holt, Ludington, is president; S. H. Humphrey, Detroit, vice president, and H. K. Greenman, Minneapolis, secretary and treasurer.

Cincinnati

CINCINNATI, Dec. 27.

Dullness continues in the machinery market. Occasional orders for single machines continue, however, and were it not for the fact that plants have been greatly enlarged since 1914, the business offered today would be considered fair, judged by conditions existing at that time. Not much change is expected until after the middle of January. A number of inquiries are being received, and it is expected that action on these will be taken shortly after the new year, as well as on railroad inquiries now before the trade, particularly those of the Big Four and Illinois Central. The latter road purchased an engine lathe for its Paducah, Ky., shops the past week. This was on a supplemental list issued since the larger one was sent out several months ago, and gives hope that other business now pending will soon be placed. Operations at local plants have changed but little during the week. A number are running full time, with others on a five-day week basis. Some of the smaller shops are running with about 50 per cent of their normal forces, and it is expected that this rate will be maintained throughout the winter.

The Herold Motor Car Co., Cincinnati, has purchased the property at 208-214 Webster Street, and it is understood will build a two or three-story service station, 87 x 95 ft.

The Case-Herron Motor Pump Co., Columbus, Ohio, has been incorporated with a capitalization of $25,000 to manufacture a circulating pump for motor cars, invented by William E. Case, Columbus. F. L. Dutton, W. L. Herron, H. B. Herron and M. A. Rau are the incorporators of the company.

The Eureka Tool & Die Co., Dayton, Ohio, has been authorized to increase its capitalization from $12,000 to $50,000.

Plans have been completed for the erection of a new steam-operated power plant at the factory of the United States Playing Card Co., Beech Avenue, Norwood, Cincinnati, and bids will soon be asked. It will be one-story, 65 x 185 ft., and is estimated to cost in excess of $300,000 with machinery. Samuel Hannaford & Son, 46 Hulbert Building, Cincinnati, are architects.

The Dayton Engineering Laboratories, 329 East First Street, Dayton, Ohio, manufacturer of automobile starting equipment, etc., will defer the erection of the superstructure for its new five-story and basement addition, 200 x 330 ft., until spring. The foundation work has been completed. The plant is estimated to cost close to $1,000,000.

Milwaukee

MILWAUKEE, Dec. 27.

The machine tool trade bears a distinctly holiday character. New business is absent, but some consolation is to be found in the tone of inquiries. A few single tool orders have been filled in the last two weeks, but otherwise the market is very dull. The motor truck industry discerns signs of substantial improvement and production is being resumed on a limited scale.

The Briggs & Stratton Co., 1047 Louis Avenue, Milwaukee, has amended its corporate articles to increase its authorized capital stock from $1,700,000 to $1,950,000. It manufactures ignition specialties for the automotive industries and also builds cycle-engined sport cars, motor wheels for bicycles, and an automatic electric refrigerating machine. Stephen F. Briggs is president and chief engineer.

The Panay Horizontal Show Jar Co., 1102 Thirty-second Street, Milwaukee, is taking bids for a two-story, ell-shaped manufacturing building, 40 x 120 x 125 ft., of brick and mill construction. It will cost about $50,000, including equipment for making patented metal and glass confectionery display fixtures. The architect is Armand D. Koch, 1045 Wells Building, Milwaukee.

The Lanchin-Loehr Lubricating Piston Co., Green Bay, Wis., has increased its capital stock from $50,000 to $150,000. It recently effected a material increase in output.

The U. S. Spring Corporation, Milwaukee, has been granted a charter to manufacture vehicle springs and implements for mechanical and farm use. The capital stock is $25,000 and the incorporators are G. J. Willett, W. A. Richter, and M. D. Kelly, attorney, 705 First Wisconsin National Bank Building.

The Economy Tool Mfg. Co., Green Bay, Wis., has increased its capital stock from $25,000 to $100,000. It expects to move shortly after Jan. 1 into its new machine shop. Most of the equipment has been bought, but further purchases will be made from time to time.

The Moloch Co., Kaukauna, Wis., expects to take occupancy of the gray iron department of its new foundry and machine shop on Jan. 15, the building being 80 x 200 ft., of brick and steel. A new machine shop of similar size is expected to be ready for machinery Feb. 15. The equipment will include one 5-ton electric traveling crane of 40-ft. span for each building, and a 10-ton yard crane with 50-ft. span. The concern is a consolidation of the Kaukauna Machine Works Co. and the Moloch Automatic Stoker Co. It manufactures steam hammers, automatic stoking equipment and will engage also in the production of paper mill machinery.

The Northwest Engineering Co., Green Bay, Wis., will increase its capital stock from $1,000,000 to $1,300,000. It operates a ship construction yard and repair dock and conducts a foundry and machine shop, manufacturing marine engines and equipment.

The Rottel Refrigerating Machine Co., Milwaukee, has been incorporated with a capital stock of $85,000 to manufacture refrigerating machinery designed by Herman W. Rottel. The incorporators, besides Mr. Rottel, are Theodore Wenzerling and Fred C. Fass, 730 Third Street, Milwaukee.

The Below Sawmill Co., Marinette, Wis., has engaged Witherspoon & Engler, consulting engineers, Monadnock Block, Chicago, to design and erect new wood-working buildings costing about $500,000 with equipment. The work includes a new power house, 40 x 75 ft., with a 110-ft. stack. Foundations are being laid and superstructures will be erected early in the spring. Hiram F. Below is president and general manager.

The Thrun Machine Works, Eagle River, Wis., established Dec. 1 in temporary quarters in the Eagle Forge Building, will start work March 1 on the erection of a permanent shop, 50 x 100 ft. Inquiry is being made for a small list of equipment. It will manufacture and repair machinery, specializing in sawmill and wood-working tools. F. J. Thrun is general manager.

The Montana Tractor Co., Tinley Park, Ill., which recently completed a new two-story manufacturing building, 80 x 100 ft., at Oconto, Wis., is planning to move its main works to Oconto on Feb. 1. It has orders on its books for 2500 machines for 1921 delivery which will require practically the entire capacity for a full year.

The Central South

ST. LOUIS, Dec. 27.

The Keystone Driller Co., Joplin, Mo., manufacturer of oil drilling machinery, is considering the erection of an addition to its plant to cost about $50,000. Headquarters of the company are at Beaver Falls, Pa.

The Triplex Safety Razor Co., Erwin, Tenn., recently organized, is planning for the establishment of a plant for the manufacture of razors and razor blades. R. L. Wesley is manager.

The Bradford Tank Co., Tulsa, Okla., has been incorporated with a capital of $50,000 by F. J. Bradford, V. H. Horn and F. B. Manning, to manufacture tanks, boilers, etc.

The McWhorter-Chanute Refining Co., Chanute, Kan., has commenced foundation work for its new one and two-story refinery, estimated to cost about $200,000 with machinery.

The Southern Textile Machinery Co., 433 South Third Street, Paducah, Ky., is having revised plans prepared for its one-story addition, 90 x 200 ft., estimated to cost about $40,000. It is proposed to ask for bids in January. W. P. Paxton is manager.

The Barbee Mfg. Co., 1251 South Fourth Street, Louisville, recently organized with a capital of $50,000 to manufacture automobile radiators and other sheet metal products, has plans under way for a new plant. T. L. Barbee, Louisville, is head. J. M. Barbee and J. U. Fields, Lexington, Ky., are interested in the company.

The Creech-Duffy Coal Co., Calvin, Ky., recently organized with headquarters at Pineville, Ky., has plans under way for the construction of a new coal tipple at its local properties.

The General American Oil Co., 604 New First National Bank Building, Tulsa, Okla., is planning for the erection of a new one-story refinery in the vicinity of Baxter Springs, Kan., to cost about $100,000. A site has been acquired.

The Ira Coal Co., Stone, Ky., is planning for the erection of a new coal tipple.

The Arkansas Hydro-Electric Development Co., Cotton Plant, Ark., is having plans prepared by the J. E. Sirrine Co., Greenville, S. C., consulting engineer, for its new hydroelectric generating plant on the Little Red River, vicinity of Higden, Ark. It is proposed to begin construction early in the spring. The company has arranged for an increase in capital from $500,000 to $3,000,000. R. R. James is president.

Plans have been prepared for the construction of a plant, 60 x 200 ft., for the Mercury Body Corporation, on Eastern Parkway, Louisville, Ky. The company has a capitalization of $150,000 and it is understood that work will start in the spring. It is planned to manufacture automobile bodies for light cars. N. E. McDaniel is the president.

The machine shops of the Louisville & Nashville Railroad at Etowah, near Knoxville, Tenn., were destroyed by fire Dec. 21. Unofficial estimates of the loss amount to several hundred thousand dollars. No announcement has been made as yet whether the shops will be rebuilt.

The Gulf States

BIRMINGHAM, Dec. 27.

The San Antonio Machine & Supply Co., San Antonia, Tex., has increased its capital from $600,000 to $1,000,000.

Goodwin Brothers, Calk, Tex., are planning to rebuild their cotton gin, destroyed by fire, Dec. 14, with loss estimated at about $30,000.

The Fort Worth & Denver City Railroad Co., Fort Worth, Tex., is arranging a construction program to utilize a fund of about $3,000,000 during the coming year. At Childress, Tex., about $500,000 will be expended for additions to the locomotive and repair shops, as well as yard extensions. At Fort Worth, the company will make additions to the shops to cost about $150,000, the work to include new machine shop, power plant and other buildings. Similar extensions also will be made in the shops at Amarillo, Wichita Falls and Texline. Expenditures at these two latter places are estimated at $100,000 and $40,000, respectively. F. E. Clarity is vice-president and general manager; R. C. Gowdy, Denver, Colo., is chief engineer.

H. D. Dean, Cairo, Ga., and associates, are planning for the erection of a new plant at Tuscaloosa, Ala., to manufacture shuttles and other cotton mill machinery.

Fire, Dec. 18, destroyed a portion of the plant of the Indian Refining Co., New Orleans, La., with loss estimated at $100,000.

The Morrissey-McGee Tractor Co., Vicksburg, Miss., has been incorporated with a capital of $50,000 by T. M. Morrissey and Lindsay McGee, to manufacture motor-driven tractors and parts.

The Advance Rumely Co., La Porte, Ind., manufacturer of agricultural machinery, is having plans prepared by its architect, A Cravens, for its new plant at Amarillo, Tex., two-stories, brick, steel and concrete, and estimated to cost about $300,000, with equipment.

The Empire Refiners, Inc., Tulsa, Okla., is planning for the erection of an addition to its refinery at Gainesville, Tex., to develop an increased output over a present 15,000 bbl. capacity.

The Carson Petroleum Co., Chicago, recently organized with a capital of $5,000,000, has acquired about 500 acres, with 3000 ft. water frontage at St. Charles Parish, near New Orleans, as a site for the erection of a new refinery, estimated to cost about $1,000,000 with machinery. Edward B. Carson is president, and C. W. Carson, vice-president and general manager.

The W. T. Tate Automobile Co., Pearl and Parish streets, Jackson, Miss., will install a service and machine repair department in its new building, estimated to cost about $100,000. It will be 80 x 160 ft. I. C. Garber, Jackson, has the contract.

The Texas Portland Cement Co., Dallas, Tex., is planning for the installation of additional machinery for increased output. J. A. Wheeler is vice-president and treasurer.

California

LOS ANGELES, Dec. 21.

The City Light Department, Pasadena, Cal., has plans under way for the erection of an addition to the municipal electric power plant to cost about $300,000. A site has recently been acquired and it is proposed to have the building ready for equipment during the summer. C. W. Koiner is general manager.

The Oil Mining & Equipment Co., Fifteenth Street and Santa Fe Avenue, Los Angeles, has had plans prepared for an addition, 30 x 80 ft. A crane runway will be constructed, and new traveling crane and crawler installed.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has arranged for a bond issue to total $10,000,000. A large part of the proceeds will be used for the development of hydroelectric power, through a subsidiary organization, the Mount Shasta Power Co. The proposed new power plant will have an initial capacity of 126,500 hp. With additional units to be erected later, the output will be 420,000 hp.

An electric power plant will be erected by the Hutchinson Lumber Co., Oroville, Cal., in connection with its new mills estimated to cost in excess of $1,000,000 with machinery. C. O. Griffith is in charge.

Canada

TORONTO, Dec. 27.

The demand for machine tools continue quiet. Dealers are, however, making some sales, chiefly of single tools, and some fairly good orders have been placed recently. There is little call for small tools, but this is expected to improve early in the new year. Carbon drills which have been selling at 35 per cent off list for some time are now quoted at 40 and 5 off, becoming effective Dec. 20. The Canadian National Railways, Toronto, has sent out a requisition for a number of small tools and in addition to this dealers are looking for orders from other Canadian railroads, as well as plants in need of equipment.

Daniel J. McLaughlin, Box 620, Pembroke, Ont., is in the market for a bench lathe for experimental work.

The Huron Specialty Co., Clinton, Ont., is making arrangements to move its plant to Goderich, Ont., next spring and to make alterations and install new equipment.

The Hayes Ruppell Mfg. Co., Grand Rapids, Mich., is negotiating for a site at Essex, Ont., to establish a plant for the manufacture of Ruppellite tanks.

A. M. Anderson, Ghost Pine, Alta., will erect a machine shop at Three Hills, Alta., to cost $10,000.

The Northern Construction Co., 1114 Vancouver Block, Vancouver, B.C., will build a warehouse and machine shop on Granville Island.

The Winnipeg Motor Car, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $1,000,000. It has acquired property which will be remodeled and equipped for the manufacture of motor cars, etc.

The Canadian Perfect Wheels, Ltd., Listowel, Ont., has been incorporated with a capital stock of $100,000 by George Melrose, Max K. Becker, John H. Bender and others. It is negotiating with the city officials for a town site on which

it will erect a plant for the manufacture of motor car and motor truck disk, wire and wooden wheels.

The Mack Furnace Co., Ltd., Chatham, Ont., has been incorporated with a capital stock of $250,000 by Eliot M. Reeve, Burton L. Bedford, Charles J. Cummings and others to manufacture furnaces, stoves, heaters, radiators, machinery, etc.

The E. S. Bryant Pattern Works, Ltd., Windsor, Ont., has been incorporated with a capital stock of $40,000 to manufacture patterns and to do a general foundry and machine shop business. The incorporators are Ellsworth S. Bryant and Edward J. Mamer, Detroit, Mich.; Frederick G. Loeffler, Windsor, Ont., and others.

The Pacific Northwest

SEATTLE, Dec. 21.

Industrial activities continue to decline and in most instances plants are operating far below normal capacity. Cuts in wages have been announced in practically every line and in some cities the unemployment situation is becoming critical.

The entire plant, including equipment, stores and buildings of the Ames Shipbuilding & Dry Dock Co., has been bought by the Seattle Contract Co., the Ames company retaining the land upon which the plant is situated. The buildings will be immediately dismantled and all equipment sold.

The plant of the Inland Empire Paper Co., Millwood Wash., will be improved by the installation of new equipment costing between $85,000 and $100,000 and the capacity of the plant increased 25 per cent.

The Cascade Lumber Co., Yakima, Wash., will close its sawmill for two months and make improvements costing $50,000. Plans provide for a new boiler plant, saws, and other equipment. R. E. Slaughter is president.

The Klamath Logging Co., Klamath Falls, Ore., will build a new sawmill, construction to begin early in the spring. The company is capitalized for $250,000.

G. F. Matthews, Hoquiam, Wash., has purchased a site in Portland, on which he will erect a shipbuilding plant, work to commence soon after Jan. 1.

The Watson Bucket Plow Co., Portland, Ore., recently incorporated with $500,000 capital stock, has plans under way for a factory to manufacture the Watson plow. The officers are: William Watson, president; C. B. Hurtt, first vice-president; C. L. Wilson, secretary-treasurer.

TRADE CHANGES

The Hallidie Machinery Co., L. C. Smith Building, Seattle, Wash., has been appointed representative of the Conveyors Corporation of America, Chicago, formerly the American Steam Conveyor Corporation, handling the sale of the American steam conveyor and American trolley carrier in Washington and Oregon. The firm was organized 20 years ago. The officers are Philip Rowe, president; W. S. Dyson, vice-president; Archie McLean, secretary; and George Henderson, treasurer. Mr. Rowe was the founder of the Hallidie Machinery Co. Mr. Dyson has been with the firm for 12 years. Mr. McLean joined the Hallidie Machinery Co. four years ago and previous to that held many positions as consulting engineer. Now he is handling the engineering lines of the company, including the Underfeed Stoker Co. of America, Ridgway Dynamo & Engine Co., and the Conveyors Corporation of America in Washington, Oregon and Alaska.

As a result of the merger of the Stanley Rule & Level Co. and the Stanley Works, both of New Britain, Conn., starting Jan. 1, three new offices will be opened on the Pacific Coast: San Francisco, with S. V. Armstrong as district sales manager; Los Angeles, Cal., with L. M. Knouse as district sales manager; Seattle, Wash., with Bruce Findlay as district sales manager. These new offices will handle wrought steel hardware and carpenters' tools.

On Jan. 1, the firm name of Pilling & Crane, Philadelphia, will be changed to Pilling & Co. There will be no change in the present personnel of the firm, which is composed of William S. Pilling and J. R. Pilling. Mr. Crane retired from the firm in 1917.

IRON AND INDUSTRIAL STOCKS

Weakness of Replogle and Vanadium Featured Market Last Week

The acute weakness of Replogle and Vanadium featured the securities market last week. At its recent low of 30 Replogle was 63½ points below the high price of 1920. This shrinkage in the negotiable value of that corporation's shares suggests an unsound technical market position due to overextended brokerage loans, but other more or less fantastic theories are advanced. The common version has to do with the first suggestion. Replogle and Vanadium interests are closely allied and the weakness of one corporation's shares might easily be reflected in the market for the other's. The weakness of Replogle and Vanadium has magnified the readjustment in all iron and industrial stocks during the past month or so.

Between 55,000 and 60,000 shares of Replogle stock held on margin by brokerage houses were reported to have been purchased outright by J. L. Replogle and associates last Monday.

The difference between the 1920 high and the recent low is 32¾ points in the case of United States Steel common, which around ruling prices shows better than 6 per cent on the investment. Based on the increase in liquid assets during the past year, the stock is selling below its intrinsic value. The financial affairs of the United States Steel Corporation never were stronger.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chalm. com.	26½- 29	Int. Har. pf.....	103 -104
Allis-Chalm. pf..	70½- 71	Lack. Steel	46¾- 50⅜
Am. Can com...	21¾- 24½	Lake Sup. Corp..	7 1/16- 8½
Am. Can pf.....	72¾- 77½	Midvale Steel....	29⅜- 30½
Am. C. & F. com.	113 -119⅞	Nat.-Acme	25½- 26⅝
Am. C. & F. pf..	106¼-107	Nat. E. & S. com.	45 - 46½
Am. Loco. com..	74¼- 80¾	N. Y. Air Brake.	79¼- 81
Am. Loco. pf....	99 -100	Nova Scotia Steel	26 - 30½
Am. Rad. com...	67½- 67⅝	Pressed Steel pf.	73 - 78
Am. Rad. pf.....	.. -101	Pressed Stl. com. ..	- 90¼
Am. Stl. F. com..	27 - 30	Ry. Stl. Spg. com.	73 - 78¾
Am. Stl. F. pf...	79¼- 80½	Replogle Steel ..	30 - 69
Bald. Loco. com.	78 - 86¾	Republic com. ...	55¼- 60
Bald. Loco. pf...	92¼- 94	Republic pf	- 85
Beth. Steel com..	47 - 51⅛	Sloss com.	43 - 47
Beth. Stl. Cl. B..	49 - 54⅝	Sloss pf.	75 - 79¾
Beth. Stl. 8% pf.	99⅝-100⅛	Superior Steel ..	42 - 42½
Case, J. I., pf....	71 - 79	Trans.Williams ..	34⅞- 37¼
Chic. Pneu. Tool.	60 - 63⅞	Un. Alloy Steel..	27⅛- 30⅛
Colo. Fuel	22 - 27	U. S. Pipe com..	10⅞- 11⅛
Cruc. Steel com..	74½- 83¼	U. S. Pipe pf....	39½- 42
Cruc. Steel pf...	81½- 82	U. S. Steel com..	76¼- 79⅞
Gen. Elec.	116½-119¾	U. S. Steel pf...	104¼-105⅝
Gt. No. Ore. cert.	25 - 26¾	Vanadium Steel..	28½- 37⅝
Gulf States Steel	24¼- 29½	Va. I., C. & Coke	83 - 85
Int. Har. com...	93½- 96	Westgh. Elec....	40⅛- 41¼

Industrial Finances

The Steel & Tube Co. of America for November reports a total income of $1,379,940, a net income after taxes, etc., of $912,324, and a surplus after preferred dividends of $810,241. For the 11 months ended Nov. 30, the net earnings after taxes, etc., were $10,289,349, equivalent to $58.79 a share on the outstanding preferred stock.

OFFICE CHANGES

The Fort Dearborn Steel Co., has removed its warehouse and office to 212-214 North Jefferson Street, Chicago, where a stock of cold drawn, cold rolled strip steel tool steels, coppered Bessemer rod, drill rods, music wire, etc., will be carried.

The Johnson Gear Co., announced the removal of its plant on Dec. 15, from 735-737 Folsom Street, San Francisco, to its new modern factory, at Parker and Eighth streets, Berkeley, Cal. A sales office will be conducted at 17 Spear Street, San Francisco.

The Sues Engineering Co., structural engineer and expert on structural steel detailing, announces the opening of an office at 225 North Michigan Avenue, Chicago.

The Phoenix Mfg. Co., Grand River and Loraine avenues, Detroit, will acquire the above address on Jan. 1.

The Irving Iron Works Co., of which L. H. Skillman is Detroit manager, has moved its offices from the Lincoln Building to 401 Washington Arcade Building, Detroit.

SIDE GUIDE AND GATE FOR

NEW TRADE PUBLICATIONS

Foundries.—Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago. Booklet with the title "Foundries That Fit." Views with short descriptions of representative foundries designed by this company.

Cranes.—Milwaukee Electric Crane & Mfg. Co., Milwaukee. Catalog, 48 pages, 7½ x 10½ in. Devoted to the company's line of electric cranes, hoists and horizontal drills. The crane mechanisms, all-steel cranes for steel mill service and special cranes are illustrated and described and numerous views of cranes installed in industrial plants are shown. A number of pages are devoted to the company's horizontal drilling and boring machine, and monorail hoists of capacities of 3 to 10 tons.

Gas Engines.—C. & G. Cooper Co., Mount Vernon, Ohio. Catalog, 40 pages, 8½ x 11 in. Concerned with gas engines of horizontal double-acting 4-cycle single and twin-tandem types. They may be operated on natural, producer, blast furnace, illuminating and coke ovens gases and are built in sizes from 250 brake hp. capacity up. They are adapted to all classes of electrical and general manufacturing work and for direct driving compressor cylinders for compressing gas and air. Detail and assembled views and numerous installation views, all tinted half-tones, add materially to the excellence of the catalog.

Milling Equipment.—Ingersoll Milling Machine Co., Rockford, Ill. Catalog, 40 pages, 8½ x 11 in. Installation views of Ingersoll milling equipment with specifications and descriptions. Many of the illustrations show the machines in operation. An adjustable rail milling machine, single and double faced fixed rail milling machines, horizontal spindle milling machine, adjustable housing milling machine and continuous milling machines are typical Ingersoll machines that are illustrated and described.

Conveyors.—Godfrey Conveyor Co., Elkhart, Ind. Catalog, 16 pages, 7¾ x 10¾ in. Illustrates and describes the Godfrey conveyor system for handling coal, ashes, sand, rock, gravel, etc. The principle of the system as applied to coal, is to get coal from bottom dump cars into a chute underneath the railroad track, the chute conveying it by gravity into a bucket in which it is elevated and carried to a storage pile or an elevated bin or conveyance. Two types of overhead track, I-beam and cable-way are employed. The catalog shows installation views of the equipment.

Thermit Welding.—Metal & Thermit Corporation, 120 Broadway, New York. Three booklets. Booklet No. 17, 95 pages, 6 x 9 in., sets forth the advantages of thermit welding for mill and foundry practice. The process is described in detail, and repairs made to crank shafts, connecting rod, pinion teeth, worn pods and crank disk for blooming mill engine, are among the applications illustrated and described. Booklet 20, 31 pages, 6 x 9¼ in., gives a detailed description of the properties and characteristics of various carbon-free metals and alloys manufactured by the company. It includes an explanation of the advantages of using tung-tabs or tablets of pure tungsten metal in the production of high speed steel and other alloys containing tungsten, instead of using tungsten powder and ferro tungsten. Booklet 39 is devoted to thermit insert rail welds.

Lighting Data.—Edison Lamp Works of General Electric Co., Harrison, N. J. Six bulletins as follows: No. 8, the manufacture of the Edison mazda lamp; No. 13, calculation of the lighting installation; No. 20, commercial photometry; No. 70, the lighting of coal mines; No. 5, the Edison mazda lamp for stereopticon service, and No. 7, the incandescent lamp, its history.

Sand-Blast Machines.—Pangborn Corporation, Hagerstown, Md. Three pamphlets describing the company's rotary table sand-blasts of standard pressure suction, standard direct pressure and of standard pressure gravity types. These machines were described in THE IRON AGE, issue of Nov. 25, page 1398.

Small Tools.—Ready Tool Co., Bridgeport, Conn. Catalog 19. Illustrates and describes centers, dogs, garage sets, handy holders, lathe sets, cutting-off tools, boring-tool holders, offset side tools, etc.

Ball Bearings.—Langhaar Ball Bearing Co., Aurora, Ind. Catalog, 32 pages, 6 x 9 in. Descriptions and data of the company's self-adjusting ball bearings. These bearings are made with two rows of balls, both rows always carrying an equal share of the load.

Vises and Anvils.—Yost Mfg. Co., Meadville, Pa. Catalog No. 9, 46 pages, 5¾ x 9 in. Illustrates and describes an extensive line of vises and anvils. A number of pages are devoted to the company's soldering furnaces, supplied for either natural or manufactured gas and with pipe or hose connection.

Electric Cranes and Hoists.—Victor R. Browning, Cleveland. Catalog, 23 pages, 8½ x 11 in. Detail, assembled and installation views of electric overhead cranes and hoists. The cranes shown range in capacity from 5 to 40 tons. The hoists are furnished in sizes of ½ to 5 tons with lifts from 10 to 40 ft.

Lathes.—Seneca Falls Mfg. Co., Seneca Falls, N. Y. Catalog, 47 pages, 9 x 6 in. Illustrations and descriptions of an extensive line of screw cutting engine lathes marketed under the trade name "Star" and made in sizes of 9, 11, 12 and 13 in. and for belt or motor drive. Milling and gear cutting attachments and an automatic carriage stop are among the attachments described.

Radius Lathe and Planer Tool.—R. G. Smith Tool & Mfg. Co., Newark, N. J. Catalog. Illustrates and describes a tool for use with lathe or planer for cutting any standard radius, concave or convex. This tool was described in THE IRON AGE issue of Sept. 23, page 778.

Space Heaters.—Cutler-Hammer Mfg. Co., Milwaukee. Publication 867, 64 pages, 4 x 8¾ in. Describes electric standardized heaters, which are heating units 2 ft. in length to be connected to lighting or power circuits in the same way as an electric lamp. The booklet outlines the fields for these heaters which include their use in crane cabs, watchman's house, as a garage heater, for protecting sprinkler systems against freezing, etc.

Handbook of Landis Threading Machinery.—Landis Machine Co., Waynesboro, Pa. Booklet, 46 pages, 4½ x 7 in. A handbook compiled for the users and operators of Landis threading machinery. Instructions are given for grinding Landis chasers, and directions for care and operation of rotary die heads and threading machine, pipe die head and pipe threading and cutting machines, automatic die heads, etc. Chapters are devoted to special threads, built-up and off-set chaser holders, close to shoulder work, and cutting continuous threads on stay bolts, stay rods and stay tubes.

Clapper-Type Controllers.—Allen-Bradley Co., Milwaukee. Bulletin F-2250. Illustrates and describes the company's clapper-type controllers for mill, crane and hoist service. These controllers were described in THE IRON AGE, issue Nov. 25, page 1388.

Universal Card Holder.—Detroit Stamping Co., 951 West Fort Street, Detroit. Pamphlet. Illustrates and describes a card holder which can be used for cards of various sizes and either in a vertical or horizontal position.

The Price Trend.—Burnet-Kuhn Advertising Co., Chicago. Booklet with the title "The Price Trend." Gives opinions of Elbert H. Gary, A. Barton Hepburn, Henry C. Wallace, *Wall Street Journal*, the *Economist*, and other publications as to probable future price trends in various lines.

Packless Valve.—Defiance Packless Valve Co., 421 South Dearborn Street, Chicago. Folder. Illustrates and describes a packless valve made with a metal to metal seat and non-rising stem. It is stated that the valve will not leak. It is for use with low and high pressure steam, hot and cold water, oil and air up to and over 2,000 lb. They are made in globe and angle styles, as well as gate and navy types, including the radiator styles. The valve bonnets are interchangeable with the Jenkins type body.

Contract Machine Work.—Wallace Supplies Mfg. Co., 412 Orleans Street, Chicago. Bulletin 14. Sets forth the company's facilities for doing machine shop work on the following equipment: screw machines, lathes, millers, grinders, shapers, punch presses, drill presses, broaching machines, pipe benders, bar benders, tube benders and general assembly and bench work.

Electric Air Heaters.—Cutler-Hammer Mfg. Co., Milwaukee. Publication 862. Illustrates and describes the company's convector type air heater. Rules are given for estimating the number of heaters required for a given room.

Portable Conveyor.—Brown Portable Conveying Machinery Co., 10 South La Salle Street, Chicago. Pamphlet. Illustrates and describes portable conveying machinery for packed or loose materials.

Shearing Stresses in Reinforced Concrete Beams.—Truscon Steel Co., Youngstown, Ohio. Discusses shearing stresses in reinforced concrete beams and the advantages of rigid connection of web reinforcement. The book was written by H. S. Rogers, formerly assistant professor of structural mechanics, State University of Washington. The book gives an analytical comparison between loose stirrup designs and beams reinforced with rigidly connected shear members. Subjects discussed include: Requirements of beam design, cost of the steel and handling, stress lines, designing of shear members and anchorage of shear members. Discussions and tables of tests are also given. Two appendices discuss the anchorage at web reinforcement and bond stress.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes*

Bars:	Per Lb.
Refined iron, base price	4.70c.
Swedish bars, base price	20.00c.
Soft steel bars, base price	3.48c. to 3.70c.
Hoops, base price	4.18c. to 4.70c.
Bands, base price	4.18c. to 4.65c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.58c. to 3.80c.
Channels, angles and tees under 3 in. x ¼ in., base	3.48c. to 3.70c.

*The low prices are those of the Carnegie Steel Co. and are subject to a cartage charge of 15c. per 100 lb. in the Metropolitan district and 10c. per 100 lb. to local points in New Jersey.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.25c.
Toe calk, ½ x ⅜ in. and larger	5.00c.
Cold-rolled strip (soft and quarter hard)	10.35c. to 11c.
Open-hearth spring steel	6.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	5.50c.
Squares, flats and hex	6.00c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c.
Extra best cast steel	25.00c.

Tank Plates—Steel

¼ in. and heavier	3.78c. to 4.00c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.68c. to 5.20c.
No. 12	4.73c. to 5.25c.
No. 14	5.30c.
No. 16	5.40c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20	6.30c.	.....
Nos. 22 and 24	6.35c.	7.80c.
No. 26	6.40c.	7.90c
No. 28	6.50c.	8.00c.
No. 30	6.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	7.00c.
No. 16	7.25c.
Nos. 18 and 20	7.40c.
Nos. 22 and 24	7.55c.
No. 26	7.70c.
No. 27	7.85c.
No. 28	8.00c.
No. 30	8.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—34	—17	¾-1½ in. Butt.	— 3	+17
¾-3 in. Butt..	—38	—22	2 in. Lap.....	+ 3	+21
3½-6 in. Lap.	—33	—18	2½-6 in. Lap...	+ 1	+17
7-12 in. Lap..	—23	— 6	7-12 in. Lap....	+12	+30

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	6.00c.
Annealed soft	6.00c.
Galvanized annealed	6.75c.
Coppered basic	6.50c.
Tinned soft Bessemer	8.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	23½c. to 24c.
High brass wire	24¼c. to 25c.
Brass rod	21¼c. to 24c.
Brass tube	39¼c. to 41c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 24½c. to 25½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$8.80	$8.55
		90 lb...	8.90	8.65
		100 lb...	9.00	8.75
IC...$12.65	$11.65	IC...	9.25	9.00
IX... 14.45	13.45	IX...	10.25	10.00
IXX... 16.25	15.05	IXX...	11.25	11.00
IXXX... 17.85	16.65	IXXX...	12.25	12.00
IXXXX... 19.45	18.25	IXXXX...	13.25	13.00

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.85
IC	9.00
IX	10.00
Fire door stock	12.00

Tin

Straits pig	36c.
Bar	41c. to 46c.

Copper

Lake ingot	16½c.
Electrolytic	16½c.
Casting	16½c.

Spelter and Sheet Zinc

Western spelter	7½c. to 8c.
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	6c. to 7c.
Bar lead	7c. to 8c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	24½c.
Refined solder	20½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.

Antimony

Asiatic	7½c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....35c to 38c.

Old Metals

Business is practically impossible this week. Prices are slightly lower as a result of the sluggish conditions. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.75
Copper, heavy and wire	10.00
Copper, light and bottoms	8.25
Brass, heavy	6.50
Brass, light	4.75
Heavy machine composition	10.25
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	8.25
Lead, heavy	3.50
Lead, tea	2.50
Zinc	3.00

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